TITLE: TOWING SERVICES FOR TTC BUSES & NON-REVENUE VEHICLES FOR UP TO A 3 YEAR TERM

PROPOSAL NO: P08BI13049 **ISSUE DATE: MARCH 28, 2013**

Your firm is hereby invited to submit a Proposal to the Toronto Transit Commission for the above

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INSTRUCTIONS TO PROPONENTS

1 **Purpose** - The Toronto Transit Commission (TTC) has a requirement for the services as outlined in the Terms of Reference herein.

2 **Proposal Submission** - The Proponent shall complete the Proposal Form including the Proposal Form Price Schedule(s) and submit it in a **sealed envelope with the label included as 'Appendix A' affixed to the front of the envelope**. The Proponent shall **not** show its name on this envelope. The Proponent shall be responsible for ensuring it reviews and understands the Instructions to Proponents, Supplementary Instructions to Proponents, General Conditions, applicable Supplementary Conditions and Terms of Reference, which form this Request for Proposal (RFP). Sealed Proposals addressed as follows, will be received by the TTC at the 1st Floor Reception Desk until **2:00 p.m.** Toronto time on **FRIDAY, APRIL 19, 2013**:

ATTENTION: **HEAD – COMMISSION SERVICES DEPT.**
1900 YONGE STREET
TORONTO, ONTARIO
M4S 1Z2

Any Proposal received late according to the Commission's clock will not be considered and will be returned to the respective Proponent. Faxed Proposals will not be considered.

The Proponent is solely responsible to ensure that the Proposal submission is delivered to the address indicated above. The TTC will not be responsible to redirect any submissions delivered in error to any other of the Commission's properties.

2.1. **Proposal Results** - Proposals are not publicly opened and until the Contract award, only the names of the Proponents will be available on the Materials & Procurement website at www.ttc.ca under 'Business with the TTC'. Following the Contract award, the name(s) of the successful Proponent(s) along with award value(s) will be available at www.ttc.ca.

3 **Proposal Inquiries** - All inquiries or requests for information during the Proposal period shall without exceptions, be directed to the Buyer by e-mail at Tanya.Huynh@ttc.ca or Fax No. (416) 537-0385 or Phone No. (416) 393-7992. The Commission will only ensure responses to inquiries received at least one week prior to the Proposal closing. No assurances are given by the Commission that responses will be made to inquiries received after that date.

4 **Lobbying** -

.1 Anyone who "Lobby's" (as defined in the City of Toronto Municipal Code, Chapter 140) or is expected to Lobby a Member of the Commission (i.e. Commissioner), their staff, or any Commission officer or employee must comply with the requirements as set out in the City of Toronto Municipal Code, Chapter 140 – Lobbying). For the purposes of Chapter 140 of the City of

Toronto Municipal Code, the Commission is a "local board (restricted definition)". For further information please see City of Toronto Web site at **www.toronto.ca/lobbying**.

.2 Failure to comply with the requirements of Chapter 140 of the City of Toronto Municipal Code, may, in the Commission's sole discretion, be considered in the evaluation of the Tenderer's current or future tender/proposal submissions and award of the current or future contracts. The Commission reserves the right, at it sole discretion, to not award a contract to a Proponent who has failed to comply with the requirements of Chapter 140 of the City of Toronto Municipal Code.

5 Addenda - During the Proposal period, any change to the Request for Proposal will be made by the issuance of an addendum. For a Proposal that is posted on our website, addenda will be posted electronically on the website. It is the **Proponent's responsibility** to monitor the website to ensure they have received all the addenda issued up until the Proposal closing. For a Proposal that is issued via e-mail, courier or fax, addenda will also be emailed, couriered or faxed to the Proponent. Addenda will be issued in the form of complete replacement pages and will refer to the addendum number at the bottom of the page. The Proponent shall note in the Proposal Form the number of addenda received during the Proposal period, to acknowledge that the contents form part of its Proposal. No oral interpretations, clarification or change shall modify any of the conditions to this Request for Proposal.

6 Proposal Evaluation and Acceptance:

.1 No Proposal may be withdrawn after the RFP closing date and time, until expiration of the RFP validity specified in the Proposal Form.

.2 The Proponent shall accept all terms and conditions of the RFP unless explicitly excepted or qualified in its Proposal.

.3 Taking any exception to the RFP may render the Proposal unacceptable. Any errors or inconsistencies in the Proposal shall be subject to the interpretation of the Commission. A list of common "Bid Irregularities" and the action that will be taken by the Commission is available on the Materials and Procurement website at www.ttc.ca under 'Business with the TTC'.

.4 The Commission's right to accept or reject any Proposal, whether or not it conforms with the RFP or to cancel the RFP at any time prior to the award of contract is expressly reserved without liability to the Commission.

.5 At its discretion and following the RFP closing the Commission reserves the sole right to discuss or clarify any other matter in the Proposal of a Proponent in order to satisfy itself as to the intent of a Proposal.

.6 The Commission during its evaluation of the Proposals may require a tour of the Proponent's facilities or proposed sub-contractor's facilities in order for the Proponent to demonstrate its capabilities to perform the work as outlined within this RFP.

7 Work Performance: The Commission during the term of a contract maintains a record of the performance of the Company completing work for the Commission and this information may be shared with the City of Toronto. The past performance of Proponents in completing contracts for the Commission will be considered and the Commission reserves the right to reject any Proposal submitted by a Proponent with an unsatisfactory performance rating.

8 Municipal Freedom of Information and Protection of Privacy Act: A Proposal submitted to the Commission shall become the property of the Commission and is therefore subject to the provisions of the Ontario Municipal Freedom of Information and Protection of Privacy Act. Proponents are responsible for familiarizing themselves with the provisions of this Act.

END OF SECTION

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These Supplementary Instructions complement the Instructions to Proponents, which shall apply to the RFP except as amended below:

1 Submission Requirements - In order to aid the Commission in determining the capability of Proponents, each Proponent shall submit the following:

.1 Mandatory Requirements - The following information must be submitted with the Proponent's Proposal:

A signed copy of the Form of Proposal including:

.1 Proponent's name and address.
.2 The Price Schedule including the proposed hourly rates or fixed fee.
.3 Acknowledge that any Addenda issued by the TTC form part of the Proponent's Proposal.
.4 Signature of the Proponent.
.5 Ensure all pages of the Proposal Form are submitted.
.6 Completed Document 00422 - A list of companies for whom the Proponent has executed work(s) for a local transit system with a similar fleet of vehicles as specified in the Terms of Reference (Section 3 - Scope of Work, Section 4 – Definitions: 4.4 – 4.6) which would verify the Proponent's ability to perform the work. The Company shall have a minimum of five (5) years experience. Such list **MUST** include the names and telephone numbers of a representative involved in each listed contract. The TTC reserves the right to contact references.
.7 Completed Document 00630 – Irrevocable Letter of Credit or Bank Draft or Certified Cheque.
.8 List of Vehicles that will be used in the performance of the Work and the corresponding City of Toronto Business License Number. Included in this list is the Vehicle Plate Number, Make, Model, Year, Ministry of Transportation Vehicle Licence Number, Vehicle Identification Number (VIN). Submit information request on **Appendix 7 – Vehicle Information**. This list must show evidence that the Proponent fulfills the requirements of Terms of Reference Section 3.2.1and Section 3.2.3.
.9 Copies of the Proponent's City of Toronto's truck and operators' licence(s).

.2 Other Requirements –

The Proponent shall furnish evidence, satisfactory to the Commission, of its ability to complete the Work in accordance with the Proposal Documents by submitting the following information with its Proposal.

.1 An electronic ('soft') copy of the Price Schedule on a USB flash drive or Compact Disk (CD).

.2 Any standard agreement(s), which the Proponent proposes to be executed as part of the award of the Contract. Failure by the Proponent to supply this documentation for the TTC's review with their Proposal will constitute that the Proponent agrees to perform the Work in accordance with the RFP Documents.

.3 Information to be Submitted after Proposal Closing –

.1 Insurance Requirements: The successful Proponent shall be required to comply with the requirements as specified in SC2 – INSURANCE REQUIREMENTS of the Supplementary Conditions and provide the evidence of insurance as specified.
.2 A certificate of incorporation as evidence that the Proponent is registered to do business in the Province of Ontario
.3 Identify the primary contact (Company Representative) for the Work and provide a resume outlining their experience and qualifications. Also, identify the escalation process including the names, titles and phone numbers of the identified individuals.

PROPOSAL SECURITY

.1 The Proposal shall be accompanied by a security deposit in the form of a Letter of Credit, Bank Draft or Certified cheque in the amount of $50,000.00

.2 If submitting a Letter of Credit, it shall be completed on the TTC's standard form provided in Document 00630 – IRREVOCABLE LETTER OF CREDIT. No other form of Credit will be accepted in lieu of the TTC's form of Credit.

.3 If submitting a bank draft or certified cheque, it shall be drawn on a chartered bank or trust company with a branch in Toronto and shall be made payable to the Toronto Transit Commission. The bank draft or cheque shall be stapled to the first page of the Form of Proposal.

.4 Security deposits will be returned or released within forty-eight hours following execution of the Contract Document or issuance of the purchase order for the Contract.

2 Proposal Pricing

.1 Unless specifically shown to the contrary, Proposal prices shall be considered firm, in Canadian funds, and inclusive of all applicable costs, all applicable federal taxes (including but not limited to GST ***and HST which has been passed into legislation and is effective July 1, 2010***) and duties and all applicable Ontario provincial taxes***,*** either in force or announced prior to the Proposal closing, even if the effective date is subsequent to the Proposal closing, allowances, freight, and including fees for applicable permits, approvals and notices, with the exception of permits identified in the Specifications as being supplied by the Commission.

.2 Proposal pricing shall also include all applicable federal taxes (including but not limited to GST) and duties and all applicable Ontario provincial taxes either in force or announced prior to the Proposal closing, even if the effective date is subsequent to the Proposal closing, in accordance with GC4 - TAXES AND DUTIES.

.3 It is mandatory that the Proponent submit pricing for all Region(s) listed in the Price Schedule.

The Proponent must submit pricing on all items, for all region(s) and for all three (3) years.

The TTC reserves the right to award one (1) or multiple contracts to one (1) or more Proponents.

Price Schedule 4 - Financial Incentive (Optional)

Proponents may provide a percentage rebate for each volume tier applicable to the total sales based on purchases made in a 12-month annual calendar year, excluding taxes.

In addition, Proponents may provide a discount off the total invoice for prompt payment and the number of days from invoice received that it will be applied (if applicable).

Price Schedule 4 is optional. Proponents have the option to complete this Price Schedule.

3 Proposal Evaluation and Acceptance of Proposals

.1 The Commission is under no obligation to accept the lowest or any Proposal.

.2 Proposals will be evaluated on the basis of all information provided by the Proponent. Each Proposal will be reviewed to determine if the proposal is responsive to the submission requirements outlined in the RFP. Failure to comply with these requirements may deem the Proposal non-responsive.

.3 Following the Proposal closing, the Commission reserves the sole right to negotiate acceptable terms and conditions and to clarify any other matter in the Proposal from a Proponent(s) the Commission has determined to have offered the best overall proposals.

.4 The Commission reserves the right to award Contracts to more than one Proponent based on pricing and/or best coverage to the contract. In any event, the unit prices included in the Proposal shall be open for acceptance and applicable for all or any portion of the Work that may be awarded and performed to the upset limit price as stated in the Purchase Order.

4 Pre-Bid Meeting

.1 The Commission will conduct a Pre-Bid meeting on Friday, April 5, 2013 at 10:00 a.m. Toronto time to explain its evaluation process in general terms and to highlight common mistakes which have caused Proposals to be considered non-compliant and/or unacceptable. Also clarify the contents of the Proposal documents and answer any questions the Proponents may have with respect to the requirement. The Proponent's representative(s) shall assemble at Mount Dennis Garage (Lunch Room), 121 Industry Street, Toronto, Ontario, M6M 5B6 where they will be met by the Commission's representatives. The Proponent is not permitted within any non-public areas of the Site unless accompanied by a Commission representative.

.2 The Proponent is encouraged to have a representative present at the Pre-Proposal meeting as a subsequent meeting will not be conducted during the Proposal period.

END OF SECTION

APPENDIX A

PLEASE CUT-OUT AND AFFIX THIS ADDRESS LABEL TO THE ENVELOPE CONTAINING YOUR SUBMISSION.

TO: TORONTO TRANSIT COMMISSION

PROPOSAL NO.: P06BI13049

TITLE: TOWING SERVICES FOR TTC BUSES & NON-REVENUE VEHICLES FOR UP TO A 3 YEAR TERM

CLOSING: 2:00 P.M. TORONTO TIME on FRIDAY, APRIL 19, 2013

ATTENTION: HEAD – COMMISSION SERVICES DEPT.
TORONTO TRANSIT COMMISSION
1900 YONGE STREET
TORONTO, ONTARIO
M4S 1Z2

NOTE:

THE TORONTO TRANSIT COMMISSION CANNOT BE HELD RESPONSIBLE FOR DOCUMENTS SUBMITTED IN ENVELOPES THAT ARE NOT LABELLED IN ACCORDANCE WITH THE ABOVE INSTRUCTIONS.

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT THE BUYER REFERENCED IN THE INSTRUCTIONS TO PROPONENTS.

Toronto Transit Commission

Proposal Form

Request for Proposal – Service (January 2013)

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TITLE: **TOWING SERVICES FOR TTC BUSES & NON-REVENUE VEHICLES FOR UP TO A 3 YEAR TERM**

PROPOSAL NO: **P08BI13049**

TO: **TORONTO TRANSIT COMMISSION**

1 DECLARATION –

We, _____

(COMPANY NAME, PROPONENT)

_____

(ADDRESS)

_____

(TELEPHONE NO. INCLUDING AREA CODE, FAX NO., AND E-MAIL ADDRESS - if available)

declare that we have carefully examined the Instructions to Proponents, Supplementary Instructions to Proponents, General Conditions, applicable Supplementary Conditions and Terms of Reference and all addenda and do hereby accept the same as part and parcel of the Contract:

a) That the shareholders or partners of the company indicated above are the only persons interested in this Proposal, and no other person has any interest in this Proposal, or in the Contract proposed to be taken;
b) That our Proposal is made without any knowledge, comparison of figures, or arrangements with any other party or parties making a Proposal for the same Work and is, in all respects, fair and made without collusion or fraud;
c) That no member of the City of Toronto Council or Commissioner of the Toronto Transit Commission, or any officer or employee of the City of Toronto or of the Toronto Transit Commission is or shall become interested, directly or indirectly, as a contracting party, partner or otherwise in, or in the performance of the Contract or in the supplies, Work or business to which it relates, or in any portion of the profits thereof, or of any such supplies to be used therein, or in any of the monies to be derived there from.
d) That we are in compliance with the City of Toronto Municipal Code, Chapter 140 - Lobbying.

2 **OFFER** - We hereby offer to supply the Work as specified within the RFP, at and for the prices as detailed in the following Proposal Form - Price Schedules 1, 2, 3 & 4, in Canadian funds which includes all applicable taxes, and all other associated costs except as otherwise explicitly stated in the Proposal Form- Price Schedule.

3 **RECEIPT OF ADDENDA** – We agree that this Proposal includes addenda no. _____ to _____ inclusive as issued by the Commission during the RFP period. It is the Company's responsibility to monitor the website to ensure they have **all** the addenda issued.

4 **STATEMENT OF COMPLIANCE** – We have submitted our Proposal in accordance with Section 1 – Submission Requirements of the Supplementary Instructions to Proponents and agree to provide any additional information required per any sub-section thereof if requested by the Commission after the Proposal closing, and further we agree to accept and will comply with all terms and conditions of the Request for Proposal.

5 **INSURANCE REQUIREMENTS** – We hereby acknowledge and agree that should our Proposal be accepted by the Commission, we shall:

.1 Submit the documentation specified in SC3 - EVIDENCE OF INSURANCE, in a form acceptable to the Commission; and meet or exceed the liability limits required and comply with all other conditions specified in SC2 - INSURANCE REQUIREMENTS.

.2 Be responsible for recovering any delay to the schedule resulting from our failure to provide acceptable documentation within the time specified.

6 TERMS OF PAYMENT – We agree that the Proposal prices are based upon the payment terms as stated in SC5 - TERMS OF PAYMENT.

7 **PROPOSAL VALIDITY** – We agree that this Proposal is valid for a period of one hundred and twenty (120) calendar days from the date of closing of Proposals and that the Commission may at any time within the said period accept this Proposal whether or not any other Proposal has been previously accepted. If requested by the TTC the Proponent agrees to extend the validity for a period of up to an additional sixty (60) calendar days.

8 **SIGNATURE** - Dated this _____ day of _____Month/Year

Per: _____
(Signature)

Name: _____

Title: _____
I/We have authority to bind the Corporation.

If you are unable to submit a bid please select one of the following:

1. Cannot handle due to present capacity and cannot meet completion requirements.	☐	**3. Insufficient time to prepare a Proposal submission**	☐
2. Requirement too large/too small.	☐	**4. Other (please specify):**	☐

TORONTO TRANSIT COMMISSION
PROPOSAL NO.: P08BI13049

NOTE:

1 Proponents quoting on any of the listed 'Region(s)' MUST submit pricing for ALL Regions in order to be considered for award.

2 Proponents **MUST** price every item for each 'Region' for all three (3) years in order to be considered for award.

3 Refer to Terms of Reference Section 4.7 for a breakdown of the locations covered by each Region listed below. Each Region may be awarded as a separate Contract to one or more Proponents.

4 * Priority / Emergency tow charge will be paid in addition to the normal hook-up charge and distance travelled. (see Terms of Reference Section 3.5.8)

PRICE SCHEDULE 1

REGION 1

			ESTIMATED QUANTITIES			UNIT PRICE			EXTENDED PRICE		
NO.	DESCRIPTION			YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
1	Region 1 (Malvern Garage, Birchmount Garage, Eglinton Garage)	Hook-Up Charge (Heavy Under Reach - Front/Back Tow)	Est. Number Of Hook-Ups	2633	2896	3186				$ -	$ -	$ -
2		Hook-Up Charge (Light-Medium Under Reach - Front/Back Tow)	Est. Number Of Hook-Ups	100	100	100				$ -	$ -	$ -
3		Loaded Charge Per Km (Front/Back Tow)	Est. Number Of Kilometres	35229	38752	42627				$ -	$ -	$ -
4		Recovery Rate/Hour (Front/Back Tow)	Est. Number Of Recovery Hours	25	25	25				$ -	$ -	$ -
5		Waiting Time Rate/Hour (Front/Back Tow)	Est. Number Of Waiting Hours	150	150	150				$ -	$ -	$ -
6		Flat-Bed / Float Service | Weight Capacity: >20,000 lbs, Length: 19 - 26 feet	Est. Number of Occurrences	50	50	50				$ -	$ -	$ -
7		Flat-Bed/Float Service Charge Per Km	Est. Number Of Kilometres	100	100	100				$ -	$ -	$ -
8		* Priority / Emergency Tow Premium Charge	Est. Number of Occurrences	52	52	52				$ -	$ -	$ -
									SUB-TOTAL	$ -	$ -	$ -
									TAXES @ 13%	$ -	$ -	$ -
									TOTAL	$ -	$ -	$ -
									OPTION 1 SUB-TOTAL (Transfer this value to Price Schedule Summary)			$ -

TORONTO TRANSIT COMMISSION
PROPOSAL NO.: P08BI13049

NOTE:

1 Proponents quoting on any of the listed 'Region(s)' MUST submit pricing for ALL Regions in order to be considered for award.

2 Proponents **MUST** price every item for each 'Region' for all three (3) years in order to be considered for award.

3 Refer to Terms of Reference Section 4.7 for a breakdown of the locations covered by each Region listed below. Each Region may be awarded as a separate Contract to one or more Proponents.

4 * Priority / Emergency tow charge will be paid in addition to the normal hook-up charge and distance travelled. (see Terms of Reference Section 3.5.8)

PRICE SCHEDULE 2

REGION 2

NO.	DESCRIPTION		ESTIMATED QUANTITIES				UNIT PRICE			EXTENDED PRICE		
				YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
1	Region 2 (Mt. Dennis Garage, Wilson Garage, Arrow Garage and Queensway Garage)	Hook-Up Charge (Heavy Under Reach - Front/Back Tow)	Est. Number Of Hook-Ups	4600	5060	5566				$ -	$ -	$ -
2		Hook-Up Charge (Light-Medium Under Reach - Front/Back Tow)	Est. Number Of Hook-Ups	100	100	100				$ -	$ -	$ -
3		Loaded Charge Per Km (Front/Back Tow)	Est. Number Of Kilometres	59627	65590	72149				$ -	$ -	$ -
4		Recovery Rate/Hour (Front/Back Tow)	Est. Number Of Recovery Hours	25	25	25				$ -	$ -	$ -
5		Waiting Time Rate/Hour (Front/Back Tow)	Est. Number Of Waiting Hours	150	150	150				$ -	$ -	$ -
6		Flat-Bed / Float Service | Weight Capacity: >20,000 lbs, Length: 19 - 26 feet	Est. Number of Occurrences	50	50	50				$ -	$ -	$ -
7		Flat-Bed/Float Service Charge Per Km	Est. Number Of Kilometres	100	100	100				$ -	$ -	$ -
8		* Priority / Emergency Tow Premium Charge	Est. Number of Occurrences	52	52	52				$ -	$ -	$ -
									SUB-TOTAL	$ -	$ -	$ -
									TAXES @ 13%	$ -	$ -	$ -
									TOTAL	$ -	$ -	$ -
									OPTION 2 SUB-TOTAL (Transfer this value to Price Schedule Summary)			$ -

TORONTO TRANSIT COMMISSION
PROPOSAL NO.: P08BI13049

NOTE:

1 Proponents quoting on any of the listed 'Region(s)' MUST submit pricing for ALL Regions in order to be considered for award.

2 Proponents **MUST** price every item for each 'Region' for all three (3) years in order to be considered for award.

3 Refer to Terms of Reference Section 4.7 for a breakdown of the locations covered by each Region listed below. Each Region may be awarded as a separate Contract to one or more Proponents.

4 * Priority / Emergency tow charge will be paid in addition to the normal hook-up charge and distance travelled. (see Terms of Reference Section 3.5.8)

PRICE SCHEDULE 3

REGION 3

			ESTIMATED QUANTITIES			UNIT PRICE			EXTENDED PRICE		
NO.	DESCRIPTION			YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
1	Region 3 (Lake Shore Garage, Non-Revenue Tows and Shop-to-Shop/Yard-to-Yard Tows)	Hook-Up Charge (Heavy Under Reach - Front/Back Tow)	Est. Number Of Hook-Ups	497	547	601				$ -	$ -	$ -
2		Hook-Up Charge (Light-Medium Under Reach - Front/Back Tow)	Est. Number Of Hook-Ups	497	547	601				$ -	$ -	$ -
3		Loaded Charge Per Km (Front/Back Tow)	Est. Number Of Kilometres	27354	30089	33098				$ -	$ -	$ -
4		Recovery Rate/Hour (Front/Back Tow)	Est. Number Of Recovery Hours	25	25	25				$ -	$ -	$ -
5		Waiting Time Rate/Hour (Front/Back Tow)	Est. Number Of Waiting Hours	150	150	150				$ -	$ -	$ -
6		Flat-Bed / Float Service | Weight Capacity: >20,000 lbs, Length: 19 - 26 feet	Est. Number of Occurrences	50	50	50				$ -	$ -	$ -
7		Flat-Bed/Float Service Charge Per Km	Est. Number Of Kilometres	1000	1000	1000				$ -	$ -	$ -
8		* Priority / Emergency Tow Premium Charge	Est. Number of Occurrences	52	52	52				$ -	$ -	$ -
									SUB-TOTAL	$ -	$ -	$ -
									TAXES @ 13%	$ -	$ -	$ -
									TOTAL	$ -	$ -	$ -
									OPTION 3 SUB-TOTAL (Transfer this value to Price Schedule Summary)			$ -

TORONTO TRANSIT COMMISSION
PROPOSAL PRICE SCHEDULE SUMMARY
PROPOSAL NO.: P06BI13049

PRICE SCHEDULE SUMMARY

Proponents are requested to input the Sub-Total amount from each REGION in the following summary sheet.

NO.	REGION	Sub-Total
1	Region 1 (Malvern Garage, Birchmount Garage and Eglinton Garage)	$
2	Region 2 (Mt. Dennis Garage, Wilson Garage, Arrow Garage and Queensway Garage)	$
3	Region 3 (Lake Shore Garage, Non-Revenue Tows and Shop-to-Shop/Yard-to-Yard Tows)	$
PROPOSAL TOTAL		$ -

FINANCIAL INCENTIVE

OPTIONAL PRICE SCHEDULE 4

NO.	TOTAL ANNUAL PURCHASE VOLUME - TIERS	PERCENTAGE REBATE BASED ON EXPENDITURES
1	$500,000 to $999,999.99	%
2	$1Million to $1,499,999.99	%
3	$1.5 Million to $1,999,999.99	%
4	$2 Million and over	%

NOTE:

Proponent(s) to provide a percentage rebate for each volume tier applicable to the total sales based on purchases made in a 12-month annual calendar year, excluding taxes. The rebate will be taken on a yearly basis.

Proponent to enter "0%" in the "PERCENTAGE REBATE BASED ON EXPENDITURES" column if a rebate is not offered. If field is blank, it shall be interpreted as "0%" rebate offered.

Discount off monthly invoice total for prompt payment	_____ %
	_____ days

Proponent to enter "0%" in the field above if a discount is not offered. If field is blank, it shall be interpreted as "0%" discount offered.

Corporate Summary
(Include: location(s), number of years in business, number of employees, ownership information, nature of business)

Project Staff Summary
(Include: Name of main contact person, relevant experience qualifications. List of people to be assigned To the Work, along with Their skills/experience/ Relevant qualifications i.e. Academic, applicable certificates, Training, professional Designations, trade union Memberships, or other Memberships relevant to the Work i.e. machinist associations etc.)

YOU MUST SUBMIT THIS PAGE WITH YOUR PROPOSAL

Similar Contract Completed
(general description, work, contract value, Name of owner contract name, duration of contract, date completed)

Similar Contract Completed
(general description, work, contract value, Name of owner contract name, duration of contract, date completed)

Similar Contract Completed
(general description, work, contract value, Name of owner contract name, duration of contract, date completed)

YOU MUST SUBMIT THIS PAGE WITH YOUR PROPOSAL

Toronto Transit Commission
Materials and Procurement
1138 Bathurst Street
Toronto, Ontario M5R 3H2
Attention: Head – Materials and Procurement

Dear Sirs:

We hereby authorize the Toronto Transit Commission to draw on the _____(Financial Institution), Toronto up to any aggregate amount of _____ $ _____ available by drafts at sight as follows:

Pursuant to the request of our customer(s), _____ (Company Name), we, hereby establish and give to you an Irrevocable Letter of Credit in your favour in the total amount of $ _____ which may be drawn upon us by you and which demand we shall honour without enquiring whether you have the right as between yourself and our said customers to make such demand and without recognizing any claim of our said customers.

Provided, however, that you are to deliver to the _____(Financial Institution) , Toronto at such time as a written demand for payment is made upon us, your signed statement that the monies drawn pursuant to this Letter of Credit are pursuant to obligations related in your Contract with _____ (Company Name). The amount of the Credit shall be reduced from time to time by notice in writing given to the undersigned by the Toronto Transit Commission.

This Letter of Credit will continue up to _____ and will expire on that date.

This Letter of Credit shall be renewed from year to year on its anniversary date unless we give you notice in writing 30 days prior to the expiry date or an anniversary thereof.

The drafts drawn under this Credit are to state on their face that they are drawn under the _____ (Financial Institution), Toronto, Ontario, Letter of Credit No. _____ dated _____ .

We hereby agree that drafts drawn in conformity with the terms and conditions of the Credit will be duly honoured on presentation.

This Letter of Credit is subject to the "Uniform Customs and Practice for Documentary Credits (1993 Revision) International Chamber of Commerce Publication No. 500."

Authorized Signature: _____

Title: _____

Countersigned: _____

Title: _____

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GC1 **DEFINITIONS**: The following definitions apply to the Contract Documents and references to the singular throughout the Contract Documents shall be considered to include the plural and vice versa, as the context requires:

.1 **"Commission" or "TTC"** - Toronto Transit Commission.

.2 **"Commission's Representative"** - The individual designated from time to time by the Commission, to exercise such power, authority or discretion as is required under the Contract.

.3 **"Company"** - The Proponent to whom the Commission has awarded the Work, its successors and assignees.

.4 **"Company's Representative"** - The person(s) used by the Company to complete the Work, whether directly employed by or under contract with the Company or provided by a Subcontractor.

.5 **"Contract"** - The agreement entered into by the Commission and the Company to perform their respective duties, responsibilities and obligations as prescribed in the Contract Documents.

.6 **"Contract Amendment"** shall mean a written order to the Company for additions, deletions or other revisions to the Work as specified in the Contract Documents.

.7 **"Contract Documents"** shall mean any Contract Amendments, Purchase Order, Supplementary Conditions, General Conditions, Terms of Reference, Form of Proposal, any addenda and the Company's Proposal and the order of precedence of these documents for the purposes of interpreting the Contract shall be as listed herein.

.8 **"Notification of Award"** shall mean the notification by the Commission accepting the Proposal of a Proponent for the Work.

.9 **"Proposal"** shall mean the written offer of a Proponent to perform the Work.

.10 **"Site"** shall mean the actual place(s) designated by the Commission where the Work is to be carried out.

.11 **"Subcontractor"** shall mean the individual, firm, partnership or corporation having a direct contract with the Company to perform a part or parts of the Work.

.12 **"Work" or "Works"** shall mean the services or any part thereof, required by the Contract Documents.

.13 **City:** *The City of Toronto.*

.14 **ABCC:** *means the City or an Agency, Board, Commission or Corporation of the City. Each ABCC has its own relationship with the City and administers important services to the residents of the City.*

GC2 **INTENT OF THE CONTRACT:** The intent of the Contract is to provide for the performance and completion in every detail of the Work described or implied by the Contract Documents. The Company shall perform the Work stipulated in the Contract and any or all Contract Changes, and shall furnish, unless otherwise provided in the Contract, everything necessary for the proper performance and completion of the Work. The Company shall not assign, transfer, convey, sell or otherwise dispose of the whole or any part of the Contract without the prior written consent of the Commission.

GC3 **LAWS TO BE OBSERVED:** The Contract shall be governed and interpreted in all aspects by the laws of Ontario. In the performance of the Work, the Company shall observe and comply with the statutes and regulations of Canada and the Province of Ontario and with the by-laws of the Municipalities within which the Work is located, so far as the said statutes, regulations and by-laws affect the Work or control or limit the actions of persons engaged in the Work.

GC4 **TAXES AND DUTIES**: The Contract price whether an upset limit or fixed fee shall be inclusive of all Canadian federal taxes, including the Goods and Services Tax, applicable under the Excise Tax Act and all customs and duties under the Customs Act and all Ontario provincial taxes applicable under the Ontario Retail Sales Tax Act, either in force or announced prior to the Proposal closing date, even if the effective date is subsequent to the Proposal closing date. If a change in the tax or duty payable is announced subsequent to the Proposal closing date, any change in tax or duty payable will be to the account of the Commission. No additional costs for administration or overhead and profit will be allowed on such changes and the Company shall supply at no cost to the Commission, sufficient documentation to permit a determination of the resulting change.

GC5 **INDEMNIFICATION:** The Company shall hereby assume the defence of, fully indemnify and hold harmless the Commission, the Commission's Representative, consultants, agents and employees, in respect of the amount of any claim, demand, loss, cost, expense (including reasonable legal expenses), action, suit, proceeding, liability, fine, penalty, interest, payment or damage (collectively referred to as "Claims") by whomsoever (including, without limitation, the Commission) which is made, sustained, brought or prosecuted in any manner based upon, occasioned by or attributable to any breach of the Contract by the Company, or to any wilful misconduct, fault, or negligent act or omission of the Company or any person, agent, consultant, firm or corporation for whose acts the Company is liable at law. Further, the Company shall pay any amount of Claims incurred by the Commission on account of any injuries, including death or damages, received or sustained by any persons or property and if it fails to do so, the Commission may pay such Claims and deduct the amount thereof from any monies due, or to become due, to the Company, or otherwise recover such amounts or any balance thereof from the Company.

Notwithstanding anything to the contrary contained in the Contract, in no event shall either party be liable to the other party for any consequential damages, including, but not limited to, claims for loss of profit or reputation.

GC6 **STAFF AND METHODS:** The Company shall use the best available methods in performing the Work and shall employ only skilled and competent staff thereon, who shall observe that degree of care and skill which is customary and usual for staff appointed in a similar capacity in performing work in a basis which is reasonably comparable to the work and will be under the supervision of a senior member of the company's staff. The Company's Representative shall be as specified to the Commission and the Company shall advise the Commission of any proposed replacement of personnel to be provided pursuant to this Contract and shall submit the proposed replacement personnel to the Commission's Representative for approval at least one week prior to such replacement.

GC7 **REPORTING OF PROGRESS**: If requested by the Commission's Representative, the Company shall provide an update of the progress of the Work completed in a form agreeable to the Commission.

GC8 **CHANGES IN THE WORK AND CLAIMS**: During the Contract, the Commission may make changes in the Work by altering, adding to, or deducting from the Work without invalidating the Contract. No change in the Work is to be commenced without a Contract Amendment or written instruction from the Commission. In the event that the Company is requested to perform work that is, in its opinion, additional to that covered by the Contract, then the Company shall provide notice in writing of its intention to make a claim prior to proceeding and thereafter shall maintain records of such work to substantiate any claim for extra work for submission for consideration by the Commission. The Company's notice of claim shall set forth particulars of the claim, the probable extent of the work, the estimated monetary value involved and the relevant provisions of the Contract Documents. If this procedure is not followed and no notice is given, it will be deemed that payment is included in the Contract price and no additional payment or extension to the Contract duration shall be made. The Commission will not pay interest or financing on outstanding monies owed to Companies or Subcontractors as a result of changes or claims submitted.

GC9 **CONFIDENTIAL DATA**: Except as specifically required to perform the Work, the Company, its partners, directors, employees, officers, agents and Subcontractors, shall not divulge or use elsewhere any information regarding the

Commission and its operation acquired or discovered during the performance of the Work without the prior written consent of the Commission.

GC10 **RESPONSIBILITY FOR PROVISION OF SERVICE:** The responsibility for providing the service required by this Contract is that of the Company. The Commission shall bear no responsibility for Company Staff, and in particular there shall be no responsibility to hire, train, direct, discipline, take source deductions, pay or terminate, etc., such Company Staff. Such functions are the sole responsibility of the Company or its Subcontractors, as the case may be.

GC11 **WORKERS' RIGHTS:** In accordance with the Ontario Human Rights Code, the Company shall not discriminate against workers or applicants for employment as workers because of race, creed, colour, national origin, political or religious affiliation, gender, sexual orientation, age, marital status, record of offences, family relationship, or disability.

GC12 **RECORDS AND AUDIT:** The Commission may inspect and audit the books, payrolls, account and records of the Company at any time as deemed necessary by the Commission prior to completion of the Work and thereafter for a period of two (2) years, to verify the Company's valuations of Contract Amendments, cancelled Work and claims, and the Company shall supply certified copies of the books, payrolls, accounts and any other records to the Commission or access to same as required by the Commission.

GC13 **SEVERABILITY:** Any condition, clause, section, subsection or other subdivision of the Contract or any other provision of this Contract which is, or becomes, illegal, invalid or unenforceable, shall be severed from this Contract and be ineffective to the extent of such illegality, invalidity or unenforceability and shall not affect or impair the remaining provisions thereof.

GC14 **SUSPENSION OR TERMINATION:** The Commission may for cause or convenience, suspend or terminate further performance of all or any portion of the Work at any stage of undertaking by notice in writing to the Company. On the date of receipt of such notice, the Company shall immediately discontinue the Work being performed by itself or its Subcontractors as instructed and shall preserve all Work in progress and completed Work. The Company will be reimbursed for that portion of the Work satisfactorily performed or completed to the date of such notice. The Commission shall not be liable for any other costs arising from such notice including but not limited to loss of anticipated profits or loss of opportunity.

GC15 **TERMINATION FOR DEFAULT:**

.1 The Company shall be in default of the Contract and the Commission may terminate the Contract if the Company:

- .1 Suspends the whole or any part of the Work without cause before completion.
- .2 Fails or refuses to proceed with the Work with due diligence or fails or refuses to maintain the Contract schedule.
- .3 Ceases or threatens to ceases to carry on its business, or if there occurs, at any time, an act or event of bankruptcy or insolvency of the Company (as defined or provided for in any applicable statute), or if any proceedings, voluntary or involuntary, by or against the Company under any statute or statutory provisions relating to bankruptcy, insolvency, liquidation, arrangement, re-organization or dissolution are commenced, or if the Company makes any proposal under the Bankruptcy Act or if the Company or the property or assets of the Company become subject to the Winding Up Act, or if any application is made with respect to the Company under the Companies' Creditor Agreement Act or under similar legislation, or if any order shall be made or a resolution passed for the winding up, liquidator or similar official is appointed for the property or assets of the Company.
- .4 Continually or fails to supply sufficient skilled workers, or Products of the proper quality or quantity.
- .5 Fails to make payments promptly to supplies or Subcontractors for materials, Products and labour.
- .6 Disregards or fails to comply with statues, regulations, by-laws or the instruction of the Commission's Representative.
- .7 Continually or repeatedly refuses or fails without cause to perform the Contract in strict accordance with the Contract Documents.

.2 In the event that the Company is in default of the Contract as outlined herein, the Commission's Representative may serve written notice upon the Company specifying the default and instructing the Company to remedy such default.

.3 If the default continues for four (4) calendar days after the date of serving the said notice of default, the Commission may serve upon the Company written notice of its intention to terminate the Contract.

.4 If the default continues for four (4) calendar days after the date of serving the said notice of intention to terminate the Contract, the Commission, upon issuance of written notification from the Commission's Representative that sufficient cause exists to justify such action and without prejudice to any other rights or remedies it has, may terminate the Contract.

.5 If the Commission is required to complete the Work, the Company shall nor be entitle to receive any further payment until the Work is complete. If the unpaid balance of the Contract price exceeds the reasonable cost of completing the Work and any damages incurred by reason of the Company's default, such excess shall be paid to the Company.

.6 If such reasonable cost of completing the Work including damages exceeds the Contract price, then the Company shall be liable to the Commission for any additional cost in completing the Work.

END OF SECTION

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SC1 **SCOPE OF SUPPLEMENTARY CONDITIONS:** The General Conditions shall apply to the Contract except as amended in these Supplementary Conditions.

SC2 **INSURANCE REQUIREMENTS:** Throughout the term of the Contract [and any warranty period], the Company shall obtain and maintain at their own expense the following insurance in relation to the Work, any services required to be performed by the Company under the Contract Documents, or otherwise, each such policy to be issued by an insurance company licensed to carry on the business of issuing such policies in Ontario, and possessing a Best's Financial Strength Rating of at least B+.

Comprehensive General Liability Insurance – Which shall include, but not be limited to:

.1 Contractual liability coverage for liability assumed under GC5 INDEMNIFICATION;

.2 Products and completed operations coverage;

.3 Contingent employer's liability coverage, for any claims that might be brought against the Commission by any employee of the Company;

.4 Owner's and Contractor's protective coverage for all subcontracted operations;

.5 Non-owned automobile liability; and

.6 Cross liability and severability of interests clause.

Such insurance shall provide a combined single limit of not less than One Million Dollars ($1,000,000) for any one occurrence or accident for all claims arising out of bodily injury including death and damage to the property of others. Such liability insurance shall contain no exclusions in conflict with the character of the work required to be performed under the Contract and shall include the Commission as additional insured.

Automobile Liability Insurance

Automobile liability insurance with a limit of not less than One Million Dollars ($1,000,000) inclusive for any one accident or occurrence and shall insure against claims for bodily injury, including death, and for property damage arising out of the use of any vehicle owned, leased or operated by or on behalf of the Contractor in the performance of the work.

Garage Automobile Policy

The Company assumes the risk of loss or damage to the vehicle and/or equipment while under its care, custody and control and shall immediately proceed to repair, replace and make good such loss or damage without cost to the TTC, whether such loss or damage arises from any acts or omissions of the Company or of third parties or from any other cause. The Company shall obtain and maintain garage automobile liability insurance for a combined single limit per occurrence of not less than One Million Dollars ($1,000,000).

SC3 EVIDENCE OF INSURANCE:

.1 Within ten (10) calendar days of request by the Commission, the Company shall provide the Commission with certificates of insurance originally signed by the insurer or its authorized representative.

.2 At the expiry date of the policy, the Company shall provide to the Commission signed certificates of insurance evidencing renewals or replacements prior to the expiration date of the original policies, without notice or request by the Commission.

.3 Each policy shall be endorsed with an undertaking from the insurance company that such insurance will not be cancelled or reduced in coverage without thirty (30) days prior written notice by registered mail to the Commission.

.4 With the exception of automobile liability, each policy shall include an endorsement under which the insurer waives any right of subrogation it may have against the Commission and its directors, officers, employees and agents.

.5 Should the Commission be of the opinion that the insurance taken by the Company is inadequate in any respect for any reason whatsoever, it shall forthwith advise the Company of such opinion and the reasons therefore and the Company shall forthwith take out insurance of a character satisfactory to the Commission.

.6 The taking out of the insurance as aforesaid shall not relieve the Company of any of its obligations under the Contract.

SC4 COMMENCEMENT OF THE WORK: The Company may commence the Work upon Notification of Award issued by the Commission. However, the Company shall not begin the Work on the Commission's property prior to providing acceptable evidence of insurance to the Commission, if such insurance is required.

SC5 TERMS OF PAYMENT:

.1 Once in each calendar month on or before the seventh day of the month, the Company shall submit in writing a detailed invoice for the value of the Work performed during the preceding month.

.2 Payments on account of the Company's services shall be made monthly within thirty (30) days following receipt by the Commission of an acceptable invoice from the Company. In the event the thirty days falls on a weekend or public holiday, payment will be made the next business day thereafter.

SC6 SUBLETTING OR ASSIGNMENT OF THE CONTRACT: The Company shall not subcontract, assign, transfer, convey, sell or otherwise dispose of the whole or any part of the Contract without the prior approve of the Commission's Representative. The Company agrees that it shall; incorporate the terms and conditions of the Contract Documents into all subcontract agreements, be as fully responsible to the Commission for the acts and omissions of its Subcontractors, agents, and persons directly or indirectly employed by it as for its own acts or omissions. Further, nothing contained in the Contract Documents shall imply or create any contractual relationship between any Subcontractor and the Commission.

SC7 **PROPRIETARY RIGHTS:** If any design, device, process or material covered by the letters patent or trade mark, copyright, industrial design, trade secrets or other forms of intellectual property, is provided by the Company under the Contract, the Company shall indemnify, defend and save the Commission harmless from any action or claim arising out of the infringement or alleged infringement of any valid or allegedly valid patent, trademark, copyright, industrial design, trade secret or other forms of intellectual property and shall indemnify the Commission for any cost, expense and damages which it may suffer or be obliged to pay by reason of such action or claim. The Company shall pay royalties and patent fees required for the performance of the Contract. Any drawings, documents, technical data, methods, processes, tooling, and inventions; whether conceived, or developed and produced during the course of the Contract specifically for the purpose of completing the Contract, shall be the property of the Commission, who shall have sole exclusive rights for subsequent use of same, except as may otherwise be granted by the Commission. Neither the Company nor its Subcontractors shall apply for any patent in regard thereto; or divulge, use or sell any information or thing related thereto, without the prior written consent of the Commission.

SC8 **ADVERTISING AND PUBLIC RELATIONS:** The Commission reserves the right to review and approve all public relations materials and advertising related to the Contract prior to publication. The Company shall ensure that any material or advertising to be published is submitted in writing to the Commission's Representative for such approval. The Commission's Representative will provide a decision within twenty-one (21) calendar days of receiving such request for approval.

SC9 **INVOICING AND CORRESPONDENCE:** The invoices shall be in Canadian dollars and shall detail the following in a form acceptable to the Commission:

.1 General:
- The purchase order number;
- Applicable Taxes (GST, PST) shall be shown separately on the invoice;
- The Company's GST registration number;
- The work period covered by the invoice;
- Separate charges for each Contract Amendment invoiced;

.2 Unit Price/Time and Expense Basis: for time and expense charges include the following:
- Company Staff names, unit price and billing rates (per approved Company staff list);
- Hours worked (which can be supported by actual time sheets, if requested by the Commission's Representative);
- Approved time sheets for specialist Subcontractor, if applicable, for any charges for time;
- Labour rates, unit prices, or other rates;
- Detailed cost breakdown;
- Original receipts;
- Evidence of prior approval of the Commission where applicable.

.3 Invoices in duplicate shall be submitted to:

Toronto Transit Commission
Finance Department
Accounts Payable Section
1900 Yonge Street
Toronto, Ontario
M4S 1Z2
Attention: Supervisor Accounts Payable

.4 Detailed Invoice

A Detailed Invoice will be attached to the packing slip at the time of delivery.

The Detailed Invoice must include the following:

1) Reference to corresponding tow slip number

2) Unit price
3) Extended price
4) Applicable taxes
5) Description of work performed, distance traveled (in KM), including unit of measure
6) Purchase Order number
7) Credits when applicable

.5 Corporate Summary Invoice

One Corporate Summary Invoice shall be submitted by the Company on or before the 7th day of the each month to TTC Accounts Payable and the TTC System Contract Administrator, and will cover the transactions of the preceding month. The Corporate Summary Invoice will include a line total by TTC Cost Centre showing the sub-total, applicable axes, total of the purchases per Cost Centre, and the grand totals per month. The format used in the Corporate Summary Invoice shall remain consistent. Each cost centre will be shown even if there were zero (0) shipments for the month.

For example:

TTC Cost Centre	*Sub-Total*	*GST*	*PST*	*Total*
0712A	$299.79	$14.99	$23.98	$338.76
0712B	$241.37	$12.07	$19.31	$272.75
05E4	$0.00	$0.00	$0.00	$0.00
05D3	$1,073.25	$53.66	$85.86	$1,212.77
Grand Totals:	$1,614.41	$80.72	$129.15	$1824.28

The Corporate Summary Invoices are to be forwarded (preferably by e-mail) to TTC's Accounts Payable Department, copying the TTC's System Contract Administrator.

.6 All other communication, correspondence and submissions shall be directed to:

Toronto Transit Commission
Materials and Procurement Department
1138 Bathurst Street
Toronto, Ontario
M5R 3H2
Attention: System Contract Administrator (As indicated on Purchase Order)

SC10 **CLAIMS:** In the event that the Company is requested to perform work that is in its opinion, additional to that covered by the Contract, it shall provide notice in writing prior to proceeding, thereafter substantiated claims for such work may be submitted for consideration by the Commission. The Commission will not pay interest or financing costs on outstanding monies owed to the Company on claims submitted.

SC11 **REPORTS AND DOCUMENTS:** Reports, research documentation, studies, testing, etc., prepared for the Commission under this Contract shall become the property of the Commission and the Commission may use them at any time without further remuneration or consent.

SC12 **SETTLEMENT OF DISPUTES:**

.1 If a claim or another dispute arising between the Company and the Company cannot be resolved to the satisfaction of both parties then the parties may, between themselves, agree to submit the particular matter for arbitration in accordance with the provisions of the Arbitration Act of the Province of Ontario and amendments thereto.

.2 The Company shall complete the Work, in accordance with the written instruction of the Commission's Representative, notwithstanding any dispute, arbitration or any legal action initiated by either or both of the parties.

.3 Arbitration proceedings shall not take place until the completion of the Work except in a case where the parties agree that a matter in dispute is of such nature as to require immediate consideration while evidence is available.

SC13 VALUATION OR CHANGES IN THE WORK:

.1 Changes which are to be performed on a unit price basis shall be calculated using the method of measurement and unit prices contained in the Contract Documents or using unit prices subsequently submitted which are acceptable to the Commission's Representative. Changes, which are to be performed on a lump sum basis, shall be subject to negotiations between the Commission's Representative and the Company.

SC14 PROPERTY PASSES:

.1 One week prior to the commencement of Work on the site, the Company shall furnish the Commission's Representative with the names of employees to be engaged in the Work so that individual property passes may be issued.

.2 The Company shall ensure that all passes are returned to the Commission's Representative upon Contract completion and/or when the employee is no longer required on Site.

SC15 NON-RESIDENT WITHHOLDING TAXES:

.1 Certain payments to non-resident corporations or individuals may be subject to withholding taxes, under the Income Tax Act. Non-residents can apply in advance to Revenue Canada, Taxation for a waiver of the withholding tax requirement. Unless the Company provides the Commission with such waiver, taxes will be withheld as determined under the Income Tax Act.

.2 If a Company wishes to apply for a waiver it should contact:

Canada Customs and Revenue Agency
Non Resident Withholding Tax Department
1 Front Street West
Toronto, Ontario, Canada M5J 2X6

Attention: Collections Office (416) 954-0542

Apply for waiver under 'Regulation 105, bracket 1' on Non Resident Withholding Tax.

SC16 HAZARDOUS MATERIALS:

.1 The Company shall be responsible for ensuring that the provisions of the Workplace Hazardous Materials Information System (WHMIS) legislation are fully adhered to by itself and by its Subcontractors with respect to, but not limited to; proper labelling of containers, availability of Materials Safety Data Sheets (MSDS) and provision of workers' education and training regarding any hazardous materials to be used on the Site for the duration of the Contract. The Company shall further be responsible for maintaining the appropriate data on Site, including all relevant MSDS's from itself and its Subcontractors.

SC17 CONTRACT PRICING:

.1 Throughout the term of the Contract, new items may be added or deleted from the Appendicies. For items that are added, the System Contract Administrator will negotiate discount.

SC18 SELLING PRODUCTS TO TTC EMPLOYEES:

.1 If the Company sells any of its products to a TTC employee (or any other person who may be working on TTC property) for their personal use, the Company is not permitted to deliver such products to the TTC employee at their work location or any other location within any of the TTC's properties.

SC19 WAGE RATES

.1 The Contractor shall engage, or cause to be engaged by it or its Subcontractors, competent workers who are members of local trade unions having appropriate affiliations, if available, for Work normally performed on Site in the execution of the Contract.

.2 During the term of the Contract, the Contractor and its Subcontractors shall pay or cause to be paid for the Work, the union rate prevailing in the area in which the Work is to be performed and shall otherwise comply with the local union working conditions.

.3 If there is no such union rate for any class of work; the Contractor shall pay the rate of wages prevailing and generally accepted.

SC20 TAXES AND DUTIES

The following supersedes GC4 – TAXES AND DUTIES in its entirety and any cross reference thereto:

.1 ***The Contract Price is inclusive of all applicable Canadian federal and provincial taxes and duties, either in force or announced prior to the Proposal closing date, even if the effective date is subsequent to the Proposal closing date, including but not limited to; the Goods and Services Tax (GST) applicable under the Excise Tax Act, and the Harmonized Sales Tax (HST) which will become effective July 1, 2010 (and which will supersede GST and ORST on the effective date), all customs and duties applicable under the Customs Act and Ontario Retail Sales Tax applicable under the Ontario Retail Sales Tax Act, (which will be superseded by the HST, starting July 1, 2010).***

.2 If a change in the tax or duty payable is announced subsequent to the Proposal closing date, any change in tax or duty payable will be to the account of the Commission. No additional costs for administration or overhead and profit will be allowed on such changes and the Company shall supply at no cost to the Commission, sufficient documentation to permit a determination of the resulting change.

.3 Where an exemption or recovery of government sales tax, custom duties or excise taxes is applicable to the Contract, the Company shall provide the Commission where required, with all necessary cost information including original invoices and assistance, at no cost, to facilitate such exemption or recovery of taxes and duties to the credit of the Commission.

.4 For purchases of material made after the HST is implemented, any cost savings that results to the Company as a result of being able to claim the full HST amount as an input tax credit must be passed on to the Commission. The Company shall provide the Commission with detailed documentation, as requested by the Commission at any time, supporting: (1) adjustments to the prices to deduct the PST and add the HST and (2) calculations of the tax cost savings with respect to implementation of the HST on July 1, 2010.

SC21 ABCC

The Supplier/Company acknowledges and agrees that upon request from an ABCC to purchase against the Contract (either through the same Purchase Order or through a separate purchase order), the Supplier/Company shall provide the goods/services to the ABCC at the same pricing and terms and conditions as set out in the Contract.

The Commission reserves the right to add or delete any ABCC and /or additional delivery locations during the term of the Contract.

A listing of current ABCC's may be found on the City's website: www.toronto.ca/abcc

END OF SECTION

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1 BACKGROUND

The TTC currently operates a fleet of approximately 1,865 buses, operating mainly from eight (8) various locations throughout the Greater Toronto Area (GTA), see attached **Appendix 1** - **TTC Property Locations**. The TTC maintains a 24-hour, 7-days a week operation with peak periods occurring within the hours of approximately 6 a.m. to 9 a.m. and an afternoon peak period from 3 p.m. to 7 p.m. serving more than 140 bus routes. In addition, the TTC operates approximately 231fully-accessible Wheel-Trans buses.

2 TERM OF THE CONTRACT

The Contract period shall be for up to a three (3) year term, commencing approximately upon notification of award, with the option to extend for two (2) additional one (1) year periods at any time prior to the expiration of the Contract, at the Proposal pricing and subject to satisfactory performance. In the event the TTC intends to exercise its right to extend the Contract, written notice will be provided to the Company prior to the Contract expiry date. The Contract price for any extension period will be the applicable Year 3 pricing as submitted with the proposal submission or acceptable negotiated pricing.

3 SCOPE OF WORK

3.1 To provide a 24-hour service for light and heavy under reach towing and recovery of all TTC vehicles and miscellaneous equipment. This service will include the towing/movement of TTC vehicles and miscellaneous equipment located at any intersection or side of road; and towing/movement of TTC vehicles and miscellaneous equipment located between any garage and shop within the TTC or between a TTC garage/shop and an outside company. This work also includes flatbed and float service on an as required basis. Refer to attached **Appendix 2** – **TTC Bus Fleet** for details on various bus types and fleet size per garage location. It is planned that approximately 123 Diesel-Electric Hybrid Articulated Buses will be introduced into the TTC's fleet during the term of the Contract.

3.2 TOWING VEHICLES AND EQUIPMENT

.1 The Company is required to have **available at all times** at a minimum, **four (4) heavy duty towing vehicles** with a tandem or triple rear axle configuration and a towing boom with at least eight (8) feet reach and a capacity of approximately twenty-five (25) tons equipped with frame and axle left components *AND* **two (2) medium & light-duty towing vehicles** for the performance of the Work.

.2 In addition, the Company must carry any special tow equipment or adapters as deemed necessary by the TTC.

.3 The Company must also have at a minimum, three (3) flatbed tow trucks available Monday - Friday, rated at a minimum of 12,000 pounds capacity for the performance of the Work and a minimum of two (2) units offering coverage during weekend service.

.4 Vehicles must be in good mechanical condition, conforms to all applicable laws and safety standards and be equipped with:

- Ambient noise backup alarms.
- Rotor beam or strobe type light, amber in colour, mounted on the vehicle in a manner that it can be seen from the front, read and both sides.
- A two-way communication method as detailed in Section 5.5 below.

3.3 Towing service will cover primarily the Greater Toronto Area, and occasionally the surrounding regions – Durham, Peel, York and Halton.

3.4 RESPONSE TIME

.1 During revenue service (including peak periods) where the vehicle is or was carrying passengers, all tow requests **MUST** be responded to (on scene) within **NINETY (90) MINUTES** from dispatch receiving the call.

.2 Should the Company be delayed in responding to (on scene) the call within ninety (90) minutes, the Company must immediately inform the TTC Requestor of the delay.

.3 Non-revenue service related vehicle tows, including but not limited to, revenue vehicle shop-to-shop/garage-to-garage moves, warranty tows, and off-site transports, **MUST** be responded to (on scene) within four (4) hours of dispatch receiving the call or within another time period at the discretion of the TTC Representative, if beyond the four (4) hours.

.4 Float service moves **MUST** be responded to within eight (8) hours of dispatch receiving the call and the move completed within twenty-four (24) hours of dispatch receiving the call.

.5 If the Company is not able to respond (on scene) within the time periods stated in 3.5.1, 3.5.2 and 3.5.3, subject to 3.5.6, the Company is responsible for procuring the services of one of the **TTC approved** (companies awarded towing contracts by the TTC) towing companies. Any increase in cost incurred by the TTC in such circumstance will be charged back to the Company on the next monthly invoice.

.6 TTC reserves the right to procure services from one of the TTC approved towing companies. In such circumstance, TTC shall make payments for the service directly to the 'approved' towing company.

.7 On occasion, the Company may be required to perform **priority/emergency** tows (including but not limited to, a vehicle disabled within the downtown core, on a highway or on an expressway, is blocking traffic, or is involved in an accident and emergency response personnel requires the vehicle to be immediately removed, and such requests **MUST** be responded to (on scene) within **FORTY-FIVE (45) MINUTES** from dispatch receiving the call. Dispatch will be advised during the call request that the request is a priority/emergency tow and this MUST be clearly identified on the tow slip. The priority/emergency tow premium charge will apply to such tows.

.8 The TTC acknowledges that with respect to the towing of oversized loads/vehicles (exceeding the current applicable City of Toronto's Annual Permit for oversized loads/vehicles dimensions), the Company may be unable to meet the required response times stated in 3.5.1, 3.5.2, 3.5.3 and 3.5.7. In such instances, the Company MUST communicate in writing to, the TTC Requestor at the home garage/shop AND the TTC's System Contract Administrator (SCA) of such delay. The Company is responsible for contacting the City of Toronto's Right-of-Way Management Section to apply for any applicable exemption, if available.

3.5 The Company shall maintain up-to-date information about the composition of the TTC's bus fleet with regards to year, make and model and have knowledge and expertise in any and all systems pertinent to the towing of such a vehicle.

The Company must be familiar with all bus manufacturers' recommendations regarding the hook-up and towing, including the use of a flatbed tractor trailer (if applicable), of buses, including but not limited to GMC, Orion, Nova RTS, Nova articulated buses, New Flyer Low Floor, ABP Friendly, and OCC ELF para-transit buses. The Company acknowledges and

understands that during the course of the Contract, Nova articulated buses will be introduced into the TTC's bus fleet and the composition (number and type) of TTC's bus fleet may vary.

4 DEFINITIONS

4.1 ***Recovery*** – Refers to service on a vehicle other than towing. For example, aiding a vehicle that has gone off the road. In most cases, recovered vehicles will be able to be driven back into service or returned to the garage after recovery.

4.2 ***Loaded Time*** – Refers to the duration of time a vehicle is hooked-up to a tow truck.

4.3 ***Blanking Plates*** – Refers to covers for drive axle hub openings. These blanking plates are to be used whenever drive axles are removed.

4.4 ***Bus and Heavy Duty Trucks*** – Vehicles greater than one (1) ton with dual rear wheels (i.e. cube vans, stake trucks, dump trucks). The TTC's bus fleet includes 40 foot Standard Floor Diesel Buses, Low Floor Diesel Buses, Low Floor Diesel-Electric Hybrid Buses, 60 foot Low Floor Diesel Buses and in the near future Diesel-Electric Hybrid Articulated Buses.

.1 40 foot Low and Standard Floor Diesel Bus – Approximate weight ranging from 21,000 to 30,000 pounds.
.2 60 foot Low Floor Diesel (& Diesel-Electric) Bus – Approximate weight of 41,500 to 43,700 pounds.
.3 40 foot Low Floor Diesel-Electric Hybrid Bus – Approximate weight ranging from 30,800 to 32,000 pounds.
.4 Wheel-Trans vehicles consisting of ELF Overland Buses – Approximate weight ranging from 12,000 to 13,000 pounds.
.5 Wheel-Trans Low Floor Para-Transit ABP Friendly Buses – Approximate weight ranging from 15,000 to 16,000 pounds.
.6 LFS Articulated bus – Approximate weight of 43,000 pounds (approximate length 62 foot).

4.5 ***Cars and Light Trucks*** – Vehicles with a recommended maximum carrying capacity of a ¾ ton and under, or less than 1 ton with single wheel rear axle configuration (i.e. pick-up trucks, inspector cabs, parked cars, etc.).

4.6 ***Miscellaneous Equipment*** – Equipment such as sweepers, tractors, loaders, trailer generators and air compressors, lifts (/skyjacks), etc. This type of equipment shall be transported using a flatbed, and on occasion floated, as towing is **NOT** an option.
Also note that some equipment has a very low break over angle and as such the flatbed must be able to accommodate very low equipment such as sweepers.

4.7 ***Region 1***- Company is responsible for providing, including but not limited to, towing, recovery, hook-up, etc. services for TTC vehicles listed in 4.4, 4.5 and 4.6 listed above belonging to the following locations: Malvern Garage, Birchmount Garage and Eglinton Garage. Company may be requested by the TTC or an approved towing company on occasion to perform work in another region.

Region 2 – Company is responsible for providing, including but not limited to, towing, recovery, hook-up, etc. services for TTC vehicles listed in 4.4, 4.5 and 4.6 listed above belonging to the following locations: Mt. Dennis Garage, Wilson Garage, Arrow Garage and Queensway Garage. Company may be requested by the TTC or an approved towing company on occasion to perform work in another region.

Region 3 – Company is responsible for providing, including but not limited to, towing, recovery, hook-up, etc. services for TTC vehicles listed in 4.4, 4.5 and 4.6 listed above belonging to the following locations: Lake Shore Garage, non-revenue tows, revenue vehicles shop-to-shop/yard-to-yard tows and if required, providing additional coverage during incremental weather/emergency situations. Company may be requested by the TTC or an approved towing company on occasion to perform work in another region.

5 COMPANY'S SERVICES

5.1 The Company shall designate one (1) representative who shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformance with the Contract Documents. The Company Representative shall be solely responsible for invoicing, reports, production means, methods, techniques, sequences and procedures and for coordinating the various parts of the Work under the Contract.

If it is the duty of other employees to perform various parts of the Work under the Contract, the Company Representative shall submit to the TTC's SCA a list of names, positions, responsibilities and contact information and ensure that this information is updated throughout the term of the Contract.

The Company Representative shall submit to the TTC's SCA a **Customer Escalation Process** and contact information and ensure that this information is updated throughout the term of the Contract.

5.2 Company to submit monthly reports as indicated below in **Section 14 – Management Reports and Supplementary Conditions Section SC9 - INVOICING AND CORRESPONDENCE.**

5.3 The Company will be liable for all Work carried out by its employees while on TTC Properties. Company employees must wear personal protective equipment (PPE), safety shoes and protective eye wear – where required and comply with all instructions regarding safe operating procedures of their vehicle and work practices while on any TTC property.

5.4 The Company shall provide one (1) local central dispatch contact with the capability of receiving tow requests by telephone or email. This dispatch contact must be staffed 24 hours a day, 7 days a week, including statutory holidays. Upon receiving a tow request from the TTC, the Company's dispatch contact must provide confirmation to the TTC Representative that the call has been received and must provide a confirmation (/tracking) number to the requestor. The Company's dispatch contact **MUST** obtain a job order number (for non-revenue vehicle / equipment tows) from the TTC Requestor and this must be marked on the invoice. Failure to do so may result in delays in payment.

5.5 Upon dispatch, the Company shall have the capability for constant hands-free, two-way communication for the duration of the service call, and shall stay in real-time contact with the tow truck driver and the TTC Representative (if required) for the duration of the service call.

5.6 The Company must submit to the TTC's SCA (within four weeks of Contract award) a contingency action plan in the event that the Company's main towing management system is disabled. This is to ensure that performance of Work is not affected.

5.7 The Company will provide only personnel who have the qualifications, experience, knowledge, skills, abilities and necessary licenses to perform the Work.

5.8 When necessary, the Company is to provide all services and equipment necessary for minor clean-up (clean sweep) removal and proper disposal of all glass, metal, fluid spills and other collision debris at the tow site. Vehicular fluid removal utilizing absorbent materials or other materials must be disposed of consistent with environmental regulations, as applicable (DO NOT CLEAN SWEEP TO GUTTER AND LEAVE MATERIAL). There shall be no charge to the TTC for such minor clean-up.

5.9 All Company tow vehicles will have a broom, shovel and a fully charged fire extinguisher available at all times and will be responsible for minor cleaning up at towing scenes (if required) as part of the Work.

6 PERMITS AND LICENSES

The Company **MUST** have and maintain in good standing its City of Toronto's truck and operators' license and all other applicable permits and licenses required for the performance of the Work during the Term of the Contract. The Company shall also obtain and maintain in good standing any applicable permits for the towing of oversized loads/vehicles, including the City of Toronto's permit for oversized load/vehicles. The Company is responsible for all and any fees, fines, costs and expenses related to such permits and licenses.

All Company tow truck operators' must have and maintain in good standing all applicable licenses, including the Ministry of Transportation Driver's Licence, during the term of the Contract.

7 RECOVERY/TOWING

7.1 TOWING INSTRUCTIONS

.1 Ensure that the towing vehicle complies with all state, provincial, and local laws. These laws govern the required use of warning signals, night illumination, and speed limits.

.2 A safety chain system which is completely independent of primary towing attachments **MUST** be used.

.3 **NEVER** tow a vehicle over 55 kilometers (km) / hour (35 m.p.h.). The exception to this is when travelling on 400 series expressways.
.4 Refrain from going under a vehicle that has to be lifted, unless the vehicle is properly blocked and supported.
.5 Do not attempt any towing operation which may jeopardize the safety of the operator, bystanders, or other motorists.
.6 Secure all loose or protruding parts of damaged vehicles prior to towing.
.7 If the rear wheels are to be left on the ground during the tow (**front towing only**), make sure to:
a. Place the shift selector in the Neutral position;
b. As the **primary and recommended option**, mechanically disconnect the driveshaft; **or**
c. As a secondary option, remove the rear axle stub shafts, and cover the shaft openings to prevent loss of lubricant and ingress of foreign material.
.8 Refer to the **TTC Towing Booklet** (**Appendix 5**) for additional towing instructions.

7.2 **FRONT TOW / AXLE REMOVAL**
.1 Prior to front towing, drive axles **MUST** be removed for all 40' and 60' buses, as well as trucks equipped with full floating axles.
.2 Typically all Orion 7 buses are front towed unless the vehicle is damaged in a manner that necessitates a rear tow. When towing from the rear, steering **MUST** be locked using a proper steering wheel holder tool or equivalent. (**DO NOT** use the operator seatbelt to lock the wheel as this causes damages to the steering wheel tilt mechanism).
.3 Blanking plates will be supplied by the TTC to the Company for removed axles from hubs.

7.3 **SECURING SUSPENSIONS**
.1 Raised vehicles must have their suspensions secured to their chassis with chains. Shock absorbers **MUST** not be left fully extended when the vehicle is being towed.
.2 On a front wheel drive Wheel-Trans vehicle if a bellow(s) is blown, the bus **MUST** be transported on a flatbed.

7.4 **AIR SYSTEM HOOK-UP**
.1 Air systems on all 40' and 60' city buses **MUST** be connected to the tow truck's air system to ensure parking brakes are released and air suspension pressure is maintained while the vehicle is being towed.
.2 A Wheel-Trans vehicle's air compressor is electric. If tow truck air cannot be supplied, the towed vehicle's ignition can be left on, which will engage the air compressor.

7.5 **LIGHT BARS**
.1 Clearance and turn signal light bars shall be connected from the tow truck to the vehicle in tow, to provide safe and legal lighting.

7.6 The start and finish times for each recovery or towing incident must be recorded on each invoice including a job order number (for non-revenue vehicle / equipment tows).

7.7 All additional trucks, equipment, personnel or personal expenses incurred at an accident scene or recovery will not be charged back to the TTC unless agreed upon by a TTC Representative.

7.8 Wheel-Trans ELF buses or buses can be towed safely from the front of the vehicles using a traditional truck tow stinger hook-up and chains, while ensuring that the vehicle is kept at full right height position. This can be done with an air line from the tow truck supplying air into the ELF air system via the right front battery compartment. Or if necessary the vehicles ignition can be left in the ON position and the vehicles electric compressor will keep the rear suspension bellow up. The ELF rear maxi park brake must be released using the dash mounted push-pull valve or the rear brake chambers must be caged to release the rear brake shoes from the drums.

7.9 Flat bed towing **must** only be used at the request of the TTC Garage Foreperson or lead hand. If an ELF bus or Friendly bus is flat bedded without the approval of the TTC, only the normal flat rate tow charge will be charged to the TTC.

7.10 **FLAT-BED / FLOAT SERVICE**
.1 The Company shall charge the TTC a flat rate for Flat Bed or Float Work and distance travelled.
.2 This charge must be shown separately on each invoice. This must be confirmed by a signature on the user cost centre's copy of the invoice by a TTC Representative.

7.11 **VEHICLE PLACEMENT**

.1 Each tow includes a specific vehicle placement instruction upon arrival to the TTC garages or shops. The tow truck operator must ask the garage/shop Foreperson where to unhook and place the vehicle. This could be on a hoist, pit or other area within the TTC property. The tow truck **MUST** have a foreperson or senior foreperson verify the tow method before un-hooking the vehicle.

.2 Vehicles are **NOT** to be dropped on TTC property without prior instructions by a TTC Representative. (The only exception is at the Duncan Shop location, after hours, between 5:30 p.m. and 7:00 am and throughout weekends and statutory holidays – During these times vehicles shall be dropped at the north-west corner of the building, as directed by the TTC's Location Representative.

.3 The tow truck operator is to be aware of height, width and speed restrictions at all TTC locations.

7.12 **TRAFFIC SIGNS ON TTC PROPERTIES**

.1 The Company is responsible and expected to obey all traffic signs in and around all of our TTC properties (Do Not Enter, One Way (some locations may require tow trucks to drive in the wrong direction. Company will be advised of these locations), Speed Limits, etc.)

7.13 **TOW SLIP REQUIREMENTS**:

.1 All tow slips **MUST** be clearly marked with the following:

1. Date and Time of tow incident
2. The Company's tow truck driver's licence number and tow truck licence plate number
3. Make, model and TTC Unit Number/Vehicle Identification Number (V.I.N.) of towed vehicle or detailed equipment description and TTC asset number
4. Towed from and towed to address
5. Total distance towed (in kilometers)
6. TTC Employee's name (printed) & Badge number
7. Itemized description and breakdown of charges
8. Tow (circle one): Front / Rear
9. Were the axles removed (circle one): Yes / No
10. Record any special towing bylaw permits required for this tow (circle one): Yes / No
11. Warranty tow(circle one): Yes / No

.2 Tow slips **MUST** be signed for by a TTC (Location) Employee noting badge number and name. TTC cannot guarantee payment for services, which are not signed for by a TTC employee. The employee is **ONLY** signing proof of delivery of the vehicle, not payment approval. A signed copy of the tow slip shall be given to the TTC (Location) Representative.

8 CHARGES

KILOMETERS (KM) CHARGED

.1 Each towing incident MUST be billed as an individual invoice (/tow slip). All towing invoices must indicate the amount of distance travelled in kilometers for each incident. If the towing incident involves an hourly rated charge, both the distance travelled (in km) and hours charged must be recorded on the invoice (/tow slip).

.2 Towing calls from a TTC property to another TTC property shall coincide with the distance in kilometers recorded on the attached **Appendix 3** - **Distance Chart**.

.3 When a street to a TTC property incident occurs, the TTC will monitor/verify the kilometers charged with the use of a Geographical Information System (GIS) or an electronic mapping tool (such as Google Maps / Map Quest).

.4 When a TTC garage to repair garage incident occurs (for warranty repairs), the Company will use the attached **Appendix 4** – **Warranty Tow Distance Chart** to record the distance travelled in kilometers.

8.2 **WAITING TIME**

.1 On occasions, the tow truck operator may be requested to wait before moving a disabled vehicle. Reasons are numerous, i.e. waiting for a mechanic to arrive with special tools, waiting for emergency response personnel (i.e. police department, fire department, etc.), vehicle blocked in, etc. The waiting time charge will be calculated from the time when the Company's tow truck operator is instructed (by the TTC Representative) to wait until the vehicle is available for towing. The waiting time charge **does not** start when the tow truck operator arrives at the location.

.2 This charge must be shown separately on each invoice and the reason for waiting given including the TTC employee's badge number who instructed the tow truck operator to wait. This must be confirmed by a signature

on the garage copy of the invoice (/tow slip) by a TTC Representative. This charge is subject to approval by the TTC's SCA.

.3 The start and finish time of the waiting period charged must be recorded on the invoice, using precise time and without rounding to the next ½ hour or hour, etc. (i.e. 11.27 a.m. will be recorded as 11.27 a.m. and not as 11.30 a.m.)

8.3 **PRIORITY/EMERGENCY TOW**

.1 On occasion, the Company may be required to perform **priority/emergency** tows (including but not limited to, a vehicle disabled within the downtown core, on a highway or on an expressway, is blocking traffic, or is involved in an accident and emergency response personnel requires the vehicle to be immediately removed. Dispatch will be advised during the call request that the request is a priority/emergency tow and this **MUST** be clearly identified on the tow slip.

.2 The priority/emergency tow premium charge will apply to such tows.

.3 This charge must be shown separately on each invoice and must be confirmed by a signature on the garage copy of the invoice (/tow slip) by a TTC Representative.

.4 If the Company is not on scene within forty-five (45) minutes of dispatch receiving the call, only the standard hook-up charge shall be charged. The Company may not apply the premium charge to such tows.

8.4 **NON-TOWS / RECOVERY REQUIRED**

.1 On occasions, the tow truck operator may be instructed (by a TTC Representative) **NOT** to perform a tow/recovery. The TTC shall not be charged by the Company for such occurrences. The Company is required to send a non-tow/recovery confirmation to the TTC Representative.

1. Such instances include but are not limited to, when the Company is on scene after the ninety (90) minutes and the tow/recovery has been completed by another Company or the TTC, or when a call is cancelled by the TTC Representative prior to dispatch sending a tow truck to the location.

.2 Should a tow truck be on scene within the ninety (90) minutes but not be required to perform the tow/recovery, the Company shall be reimbursed for the hook-up charge ONLY. This shall be clearly shown on the tow slip and invoice.

9 DAMAGES

If a TTC vehicle is damaged during towing or recovery, the cost of repairing the damage caused by the tow truck may be charged back to the Company according to the chart below:

Labour Rate and/or Overheads ($)	Material Handling Charge (A)	Material Admin. & General Expense	For all other cost incurred - Admin. & General Expense
$109.00 /hour	Cost of material + 10%	A +10%	Cost +10%

9.2 Rates are updated on a yearly basis. The TTC's SCA will notify the Company in writing of the revised yearly rates at the start of each year of the term of the Contract.

9.3 In addition to the charges listed above, the Company will be charged $500.00 for every day that the bus is out of revenue service for loss of use of the bus. (Loss of use charge is updated on a yearly basis as per 9.2 above)

9.4 This also includes damage to building structures i.e. garage door and any equipment located on a TTC property. The TTC will notify the Company of the damage and allow the Company to view the vehicle and related damages.

9.5 The TTC is responsible for providing a detailed breakdown of the cost of damages which lists the cost of parts, total number of labour hours used to repair the damages and applicable taxes. The total cost of damages will be deducted from the next monthly invoice.

9.4 As this Contract spans for up to a three (3) year period, the TTC reserves the right to revise this rate as required due to changes in the union contracts, overheads, etc.

10 COMPUTERIZED BUSINESS PROCESS MANAGEMENT SOFTWARE (TOW MANAGEMENT SOFTWARE)

10.1 The Company is to furnish and operate a computerized record software system of adequate size and capability on which to maintain all the records, files and transactions generated as a result of the performance of the Work, during the Term of the Contract.

10.2 The TTC requires improved Company's business process management and reporting functions. The Company is to provide a web based towing management system with licensed access that meets the business needs of the TTC. If a system is not in place at Contract award, the Company is to submit a plan to implement this requirement, complete with project completion milestones to the TTC's SCA within approximately fourteen (14) business days of award notification.

10.3 The tow management system is to provide the following functions. The TTC is to have access to the system and have the capability to retrieve the TTC's historical data, account information and all other information related to the performance of the Work. In addition, the Company will provide the TTC's Representative access to any reports (with print capabilities) generated by the system.

10.4 The objective of the use of the tow management system is to provide an efficient and configurable work process that will allow the TTC to retrieve relevant information to create accurate statistical reports for budgeting purposes. The information stored in this system must be easily manipulated to generate customized reports as required. All data and reports shall be the property of the TTC.

10.5 The Company is required to have a system in place within the first six (6) months of contract award unless otherwise agreed upon by the TTC's SCA.

11 ENVIRONMENTAL RESPONSIBILITIES

The TTC has implemented a Green Procurement Policy (GPP). It is important for the TTC to partner with companies that are strategically positioned to provide leadership and guidance throughout the implementation of the GPP. Throughout the Contract the Company is to work with the TTC on improving the environmental performance of the products and services provided. The benefits (and qualifications of) may include reductions in greenhouse gases, particulate matter emissions, fuel usage and improved transportation and logistics among others. The initiatives and resulting changes to the service should provide the same level or improved technical performance at equal to or less than the current pricing.

Within ten (10) working days upon request by the TTC's SCA during the term of the Contract, the Company shall provide the TTC's SCA with the following:

- A copy of the Company's environmental policy, which articulates a commitment to continuous improvement and provides details on the policy's impact in terms of overall environmental management (if applicable).
- Evidence of the Company's implementation of, and compliance with an environmental management system (e.g. ISO 14001) (if applicable)
- An outline of the Company's approach or strategy to improving environmental performance in its delivery and other fleet vehicles (e.g. use of fuel efficient vehicles, alternative fuels, hybrid technologies, monitoring tire pressure, route optimization, minimizing emissions from idling, etc.).
- Additionally, the Company shall provide an annual report of estimated environmental benefits from the use of their services relative to industry standard practice. This shall include at a minimum:
    - Estimated volume of energy, greenhouse gas (GHG) emissions and water saved through improved efficiency.

12 SYSTEM CONTRACT – OTHER REQUIREMENTS

The Company shall assist with the implementation and smooth running of the Contract by meeting with the TTC's SCA on an 'as required' basis. The Company shall assign a dedicated Account Representative who shall be available on a regular basis to provide continued assistance to the TTC, to resolve Contract related concerns and provide technical assistance throughout the term of the Contract. Such services will normally be provided by phone calls and / or site visits to deal with various issues during the term of the Contract.

12.2 The Company shall only make changes to the account(s) based on the change request(s) provided by the TTC's SCA. The Company shall not make changes to any account(s) based on request(s) made by other TTC employee(s), unless a written pre-approval was obtained from the TTC's SCA.

12.3 Any change to the Contract, whether by modification and / or supplementation, must be accomplished by a formal Purchase Order Amendment signed and approved by and between the duly authorized representative of the Company and the TTC's Materials & Procurement – Purchasing Section prior to the effective date of such modification. The Company expressly and explicitly understands that no other method and / or no other document, including correspondence, acts, and oral communications by or from any person, shall be used or construed as an amendment or modification to the Contract.

13 TTC SERVICES

The TTC will assign a dedicated TTC Representative – System Contract Administrator (SCA) as the TTC's central point of contact for this Contract.

The TTC shall provide the following information and services available to the Company Representative as required:

1. Access to TTC properties by approved Property Permits in accordance with Supplementary Conditions Section 14 – Property Passes
2. Direction and review from time to time during the term of the Contract.
3. TTC's SCA will assist the Company with an orientation of TTC Properties, authorized Cost Centre contacts, and procedures for invoicing and reports etc.
4. Following award, the name(s) of the TTC's Location Representatives for the term of the Contract.
5. Access to staff to assist and enable planning and organization of the Work.
6. **Direction and review from time to time during the currency of the Contract.**

Any services provided by the Company from information supplied by the TTC, will be undertaken on the basis that it is the best information available, however, the Company must immediately notify the TTC's SCA in writing of any condition or information known or discovered by the Company which conflicts with the information supplied by the TTC. In any event, the TTC shall not be liable for any loss or damage arising from any inaccuracy in such information. This exclusion does not alter or modify in any manner the Company's liability for negligence.

14 MANAGEMENT REPORTS

In addition to any reporting requirements set out in the General Conditions, the Company shall supply the following reports on a monthly basis by e-mail to the TTC's SCA, within the first fifteen (15) business days of the month. These reports are intended to identify actual usage compared to TTC's estimated usage figures.
The Company must have the ability to retrieve data sorted by TTC Location and type of tow from the beginning to the end of the Contract term.

.1 Towing Analysis Monthly Usage Report - Itemized list summarizing TTC Location expenditure, with a column for each of the following:

- Location name;
- Invoice number (/tow slip number);
- Type of service(s) and the total number of each service type for each month grouped by Location;
- The date of each tow/recovery incident, period, batch , TTC unit number, kilometers travelled, the applicable firm, fixed unit cost charged (hook-up, flat bed hours, float hours), waiting time, recovery time, and any related information, taxes and total charge;
- Total cost for each month based upon the number of tow calls from the Location;
- Contract-to-date running total

All TTC locations are to be noted, even if the expenditure for that month is zero. All columns are to be totalled. The Company shall send a copy of the report to each TTC Location Representative and the TTC's SCA.
The Company must also provide the information from the report as a Comma Delimited Text (.csv) file. See **Appendix 6 – Sample Towing Data File** for a sample of the format required.

.2 Service Level Reports (i.e. response time)

.3 Vehicle list report
.4 Summary tracking of all dispatch calls

The Company must provide each TTC Location a hard copy and an electronic copy of C**ost Centre Detailed (invoice) Statement** which will summarize the service calls made each month. This monthly statement will be emailed and mailed to the Cost Centre's Primary Invoice Control Contact.

Any additional reports deemed necessary by TTC throughout the duration of the Contact.

15 MEETINGS

The TTC's Representative may arrange and chair a POST-AWARD meeting and pre-Work Assignment meeting(s). The Company shall be represented by senior field staff. The TTC's Representative will invite other interested parties whose co-ordination is required during the Work Assignment to attend.

Topics for discussion include methods and means by which full co-operation and co-ordination of all participants can be achieved during the duration of the Work Assignment.

The TTC's Representative will prepare meeting minutes and distribute copies to all relevant parties.

16 WIND DOWN CLAUSE

16.1 At the conclusion of the Contract if the new contract is awarded to a different Company, the current company will be permitted a ninety (90) days grace period to return to the TTC all blanking plates (if applicable) supplied to the Company during the term of the Contract.

16.2 If the Company is in default of the ninety (90) days grace period, the cost of all blanking plates not returned to the TTC will be deducted from the final invoice owed to the Company.

END OF SECTION

APPENDIX 1

APPENDIX 1 - TTC PROPERTY LOCATIONS

TTC PROPERTIES

Administrative Offices:

1. Engineering & Construction	1910/1920 Yonge St.
2. H.C. Patten	835 Davenport Rd.
2. J.G.Inglis	1138 Bathurst St.
2. Support Services	1138 Bathurst St.
3. McBrien	1900 Yonge St.
17. Wheel Trans	580 Commissioners St.

Carhouses:

3. Davisville	29 Lascelles Blvd.
8. Greenwood	400 Greenwood Ave.
11. McCowan	1720 Ellesmere Rd.
13. Roncesvalles	30 Roncesvalles Ave.
14. Russell	1433 Queen St. East
16. Wilson	160 Transit Rd.

Garages:

4. Arrow Road	700Arrow Rd.
5. Birchmount	424 Danforth Rd.
6. Danforth	1627 Danforth Ave.
21. Eglinton	38 Comstock Rd.
17. Lakeshore	580 Commissioners St.
10. Malvern	5050 Sheppard Ave. East
22. Mount Dennis	121 Industry St.
12. Queensway	400 Evans Ave.
16. Wilson	160 Transit Rd.

Shops:

3. Davisville	29 Lascelles Blvd.
8. Greenwood	400 Greenwood Ave.
2. Hillcrest (Duncan, Harvey)	1138 Bathurst St.

Yards:

3. Davisville	29 Lascelles Blvd.
8. Greenwood	400 Greenwood Ave.
2. Hillcrest	1138 Bathurst St.
20. Keele	2365 Dundas Ave. West

Divisions:

4. Arrow Road	700 Arrow Rd.
5. Birchmount	424 Danforth Rd.
6. Danforth	1627 Danforth Ave.
21. Eglinton	38 Comstock Rd.
10. Malvern	5050 Sheppard Ave. East
22. Mount Dennis	121 Industry St.
18. T.C.T. (Terminal)	600 Bay St.
12. Queensway	400 Evans Ave.
13. Roncesvalles	20 The Queensway
14. Russell	1433 Queen St. East
16. Wilson	160 Transit Rd.

SUBSTATIONS

1. Asquith	30 Asquith Ave.
2. Beaches	1900 Queen St. East
3. Bedford	11 Bedford Rd.
4. Beresford (closed)	586 Annette St.
5. Berwick	2180 Yonge St.
6. Broadview	769 Broadview Ave.
7. Casa Loma	278 Dupont St.
8. Coxwell	332 Coxwell Ave.
9. Davisville	1880 Yonge St.
10. Delaware	213 Delaware Ave.
11. Downsview (Carhouse)	160 Transit Rd.
12. Ellesmere	1025 Ellesmere Rd.
13. Fairholme	160 Fairholme Ave.
14. Finch	24 Hendon Ave.
15. Glenayr	4 Glenayr Rd.
16. Granby	21 Granby St.
17. Greenwood	137 Strathmore Blvd.
18. Harbourfront	21 Spadina Ave. (Queen's Quay)
19. Hillcrest	1138 Bathurst St.
20. Indian Grove	139 Indian Grove
21. Islington	1226 Islington Ave.
22. Jane	15 Jane St.
23. Kennedy	2453 Eglinton Ave. East
24. Kipling	25 St. Albans St.
25. Lakeshore	3236 Lakeshore Blvd. West
26. Lansdowne	587 Lansdowne Ave.
27. Lawrence	3030 Yonge St.
28..Lawrence East	2444 Lawrence Ave. East
29. Lippincott	386 Lippincott St.
30. McCowan	1720 Ellesmere Rd.
31. Orde	10 Orde St.
32. Parkhill	1300 Eglinton Ave. West
33. Pleasant	14 Pleasant Blvd.
34. Prince Edward	339 Prince Edward Dr.
35. Richmond	35 Richmond St. East
36. Roncesvalles	40 Roncesvalles Ave.
37. Russell	1353 Queen St. East
38. Scarborough Centre	290 Borough Dr.
39. Sheppard	2 Sheppard Ave. West
40. Sheppard West	1035 Sheppard Ave. West
41. Sumach	23 Sumach St.
42. Townsley	1850 St. Clair Ave. West
43. Trinity	109 Shaw St.
44. Victoria Park	777 Victoria Park Ave.
45. Warden	701 Warden Ave
46. Weston (closed)	1500 Weston Rd.
47. Wilson (Wilson Stn.)	160 Transit Rd.
48. York Mills	1 York Mills Rd.
49. Oakvale	73 Oakvale Ave.
50. Long Branch	169 Long Branch Ave.
51. Ossington	137 Winona Dr.
52. Danforth (closed)	2327 Danforth Ave.
53. Carlaw	369 Carlaw Ave.
54. Bayview	550 Sheppard Ave. East
55. Leslie	1209 Sheppard Ave. East
56. Don Mills	1700 Sheppard Ave. East

EMERGENCY EXITS

✱ - Denotes Emergency Cart Location

1. Birchmount	Surface entrance in the service bldg. on the west side of Birchmount Rd., south of Comstock Rd.
2. Church Ave.✱	Surface entrance is at the northeast corner of Church & Yonge St.
3. Clanton Park	Surface entrance is north from Transit Rd.(Portal Access)
4 .Glenayr ✱	Surface entrance is either east on Burton Rd. from Bathurst St. or west on Burton Rd. from Spadina Rd., then south on Glenayr Rd., to Emergency Bldg.
5. Lytton Blvd.✱	Surface entrance is at the northwest corner of Lytton Blvd. & Yonge St. Entrance is from the driveway on the north side of bldg.
6. Macdonald Cartier Freeway✱	Surface entrance via the westbound access road to 401 from southbound Yonge St., via service road through locked gates down roadway under 401 bridge through secured gates to Emergency Bldg.
7. Markdale✱	Surface entrance is north on Winnett Ave. from Vaughan Rd., east on Durham, south on Arlington to Cedarvale Arena, through parking lot to service road to entrance door in Cedarvale Pk. Ravine.
8. Massey Creek	Surface entrance is concrete structure in Massey Creek Pk., north of of C.N.R. tracks & west of creek. Park access is driveway between 125 Chelwood & 166 Woodfirn.
9. Mill St.✱	Surface entrance in a small bldg. on east side of Yonge St., halfway between Mill St. & Ivor Rd.
10. Russell Hill✱	Surface entrance off east side of Spadina Rd., south of St. Clair Ave., via service road at south end of Winston Churchill Pk. by Nordheimer Ravine.
11. Teddington Park✱	Surface entrance at southeast corner of Teddington Pk. & Yonge St.
12. Union Stn./HLRT	Surface Entrance in Union/ HLRT Loop.
13. Welbeck✱	Surface Entrance in a concrete building (200A Sheppard Ave. W.) on north side Sheppard Ave. 30 metres west of Welbeck
14. Leona Dr.✱	Surface Entrance in a concrete building (115 Sheppard Ave. E.) on south side of Sheppard Ave. E., 60 metres east of Leona Dr.
15. Wilfred Ave.✱	Surface Entrance (265 Sheppard Ave. E.) West of Wilfred Dr. off the Sheppard Subway
16. Buchan Court✱	Surface Entrance in a concrete building (1351 Sheppard Ave. E.) on north side of Sheppard Ave., east of Leslie St. at the south east corner of Buchan Crt.
17. St. Timothy✱	Surface Entrance in a concrete building (1651 Sheppard Ave. E.) on north side of Sheppard Ave., 230 metres west of Don Mills Rd.

Revised September 2007

- TTC Surface Route System
- TTC Subway System
- GO Transit Rail Lines
- Metro Emergency Operations Centre - 703 Don Mills Rd.

TTC MP 04.03.15 DRG. NO. 00009

APPENDIX 2 - TTC BUS FLEET

As of: February 4, 2013

Bus Series	Vehicle Group	Garage							Total
		Arrow Road	Birchmount	Eglinton	Malvern	Mount Dennis	Queensway	Wilson	
ORION-V DSL (1996)	7000-7134	0	0	0	135	0	0	0	135
ORION-V CNG CONV (1997)	9400-9449	0	0	0	0	0	0	50	50
NOVA RTS (1998)	7200-7251	52	0	0	0	0	0	0	52
FLYER LF (1998)	7300-7350	0	0	0	0	0	50	0	50
ORION-VII LF DSL (2003)	7400-7499	0	0	100	0	0	0	0	100
ORION-VII LF DSL (2004)	7500-7619	0	0	120	0	0	0	0	120
ORION-VII LF DSL (2005)	7620-7882	0	181	81	0	0	0	0	262
ORION-VII LF CLN DSL (2006)	7900-7979	70	0	0	0	0	10	0	80
ORION-VII HYB (2006)	1000-1149	0	0	0	74	76	0	0	150
ORION-VII LF DSL DPF (2007)	8000-8099	0	0	0	0	0	100	0	100
ORION-VII HYB NG (2007)	1200-1423	170	0	0	0	25	0	28	223
ORION-VII HYB NG (2008)	1500-1689	0	0	0	0	188	0	0	188
ORION-VII HYB NG (2009)	1700-1829	0	0	0	80	0	0	50	130
ORION-VII LF CLN DSL NG (2010)	8100-8219	0	58	0	0	0	0	62	120
ORION-VII LF CLN DSL NG (2011)	8300-8334	0	0	0	0	0	0	35	35
ORION-VII LF CLN DSL NG (2012)	8335-8396	0	0	0	0	0	0	62	62
Total		292	239	301	289	289	160	287	1857

APPENDIX 3 – DISTANCE CHART

DISTANCE IN KILOMETERS	Hillcrest	Davisville	Eglinton	Danforth	Birchmount	Greenwood	Russell	Lakeshore	Roncesvalles	Queensway	Wilson	McCowan	Malvern	Arrow Road	Victoria Park	Keele Station	Mount Dennis	Asquith SBE
Hillcrest		5	18	10	16	10	13	15	8	18	11	27	30	21	14	9	10	3
Davisville	5		13	10	16	10	12	15	13	23	13	20	23	21	18	14	15	3
Eglinton	18	13		6	6	8	12	14	26	35	25	14	16	34	8	25		
Danforth	10	10	6		6	2	3	6	18	27	21	19	23	36	3	19		7
Birchmount	16	16	6	6		8	9	13	24	32	26	13	17	35	2	22		
Greenwood	10	10	8	2	8		2	5	16	27	21	21	25	34	6	14		
Russell	13	12	12	3	9	2		4	14	25	24	22	26	36	8			
Lakeshore	15	15	14	6	13	5	4		12	21	26	26	30	42	11	15		
Roncesvalles	8	13	26	18	24	16	14	12		9	20	39	43	19		4		
Queensway	18	23	35	27	32	27	25	21	9		28	48	52	24				
Wilson	11	13	25	21	26	21	24	26	20	28		21	24	15	27	20		
McCowan	27	20	14	19	13	21	22	26	39	48	21		4	31	15	33		
Malvern	30	23	16	23	17	25	26	30	43	52	24	4		34	19	38		
Arrow Road	21	21	34	36	35	34	36	42	19	24	15	31	34			15	11	24
Victoria Park	14	18	8	3	2	6	8	11			27	15	19					
Keele Station	9	14	25	19	22	14		15	4		20	33	38	15				12
Mount Dennis	10	15												11				13
Asquith Substation	3	3		7										24		12	13	

Date Updated: March 2008

APPENDIX 4 - TTC WARRANTY DISTANCE CHART

(DISTANCE CALCULATED IN KILOMETERS)

	Harper Power Products Inc. 10 Diesel Drive Toronto, ON M8W 2T8	**Cummins Eastern** Canada 7175 Pacific Circle Mississauga, ON L5T 2A5	**"AAA" Coach Repair** 235 Deerhurst drive Brampton, ON L6T 5K3	**MTB 8170** Lawson Road Milton, On L9T 5C4	**MMC BUS** 353 Arvin Ave., Stoney Creek, ON	**Mississauga Bus** Coach & Truck Repairs 1250 Midway Blvd. Mississauga, ON	**SN Diesel** 221 Caldari Road Concord, ON L4K 3Z9	**City View Truck and Coach Repair** 71 City View Drive Etobicoke, ON M9W 5A5	**Jet Garage** 78 Hymus Rd. Scarborough, ON M1L 2C9
Hillcrest 1138 Bathurst Street Toronto, ON M5R 3H2	**18**	**32**	**33**	**51**	**74**	**30**	**28**	**20**	**17**
Eglinton Division 38 Comstock Road Toronto, ON M1L 4V8	**31**	**43**	**46**	**62**	**86**	**42**	**40**	**32**	**1**
Birchmount Division 400 Danforth Road Scarborough, ON M1L 3X6	**27**	**47**	**48**	**66**	**83**	**45**	**44**	**35**	**4**
Lakeshore 580 Commissioners Street Toronto, ON M4M 1A7	**19**	**37**	**42**	**56**	**74**	**36**	**48**	**29**	**11**
Queensway 400 Evans Avenue Etobicoke, ON M8Z 1K6	**1**	**20**	**25**	**39**	**59**	**20**	**33**	**14**	**31**
Wilson 160 Transit Road North York, ON M3H 1T8	**24**	**25**	**26**	**44**	**77**	**24**	**16**	**14**	**20**
Malvern Division 5050 Sheppard Avenue East Scarborough, ON M1S 4N3	**42**	**43**	**44**	**62**	**96**	**43**	**41**	**33**	**13**
Arrow Road Division 700 Arrow Road North York, ON M9M 2M1	**22**	**23**	**18**	**42**	**76**	**23**	**12**	**14**	**31**
Mount Dennis Division 121 Industry Street Toronto, ON M6M 5B6	**17**	**24**	**26**	**43**	**74**	**14**	**20**	**11**	**30**

APPENDIX 5

TORONTO TRANSIT COMMISSION

TOWING BOOKLET

The information in this booklet will be useful to those providing towing services to the Toronto Transit Commission.

TOWING PROCEDURES FOR TORONTO TRANSIT COMMISSION BUSES

Under NO circumstances shall a bus be towed from the front without removing the drive axle shafts. This is required to prevent damage to the transmission and drive line components. Axle shaft openings shall be covered to prevent contamination and loss of lubricant. The TTC shall provide “AXLE PLATE COVERS” to the Company. These shall be returned at the termination of the Contract.

The “tow eyes” are designed for flat towing the bus ONLY with all of the bus’s wheels on the ground. Lifting the vehicle by the tow eyes is forbidden, as it would cause serious damage.

If the bus must be lifted to facilitate towing, chains shall be attached to the frame ends of the left and right radius rod brackets. The ends of these chains shall be attached to the towing vehicle apparatus. Raised buses shall also have the suspension secured to the chassis to prevent damage from overextending. A loader divider, such as a piece of 4” X 4” hardwood shall be used under the front bumper support brackets.

The air system on a disabled bus in tow shall be connected to the towing vehicle’s air system. A minimum pressure of 100 PSI is required to ensure parking breaks remain released and air suspension pressure is maintained while the bus is towed.

A bus being towed must be equipped with turn signal and brake lighting bars and any other lighting required by law to provide safe and legal lighting.

When towing a bus from the rear, care shall be taken to avoid sudden wheel shocks that could damage bus steering components i.e. driving over a curb and or large pot holes.

The following pages contain towing excerpts taken from bus manufacturers’ service manuals detailing towing practises for TTC’s buses. These are provided to the Company to ensure that the correct towing practises are followed for each bus group and to prevent damage to the bus.

NOTE: All towing related questions or concerns are to be directed to the System Contract Administrator, Jackie Clarke at 416-393-6968.

Orion

RAISING AND SUPPORTING FRONT OF VEHICLE USING FLOOR JACKS AND SAFETY STANDS

1. Ensure the transmission selector is in NEUTRAL, release Parking Brakes prior to raising vehicle with jacks.

   NOTE: If system air is depleted, either cage spring brakes, or connect a filtered shop air supply, 70 psi minimum, to hold off spring brakes. This will also maintain air suspension system pressure.

2. Using two floor jacks, position the concave head of each floor jack under the front tow eyes.

   NOTE: Do Not position the jacks parallel to the bus body, but rather at an angle away from the side being raised (toward center line of the vehicle). This will allow the jacks to roll with the suspension as bus is raised.

3. Raise each floor jack until the centre of the lifting pad contacts the tow eye. Check to be sure the pad of each jack is securely positioned under the tow eye. See figure 00-2-1.

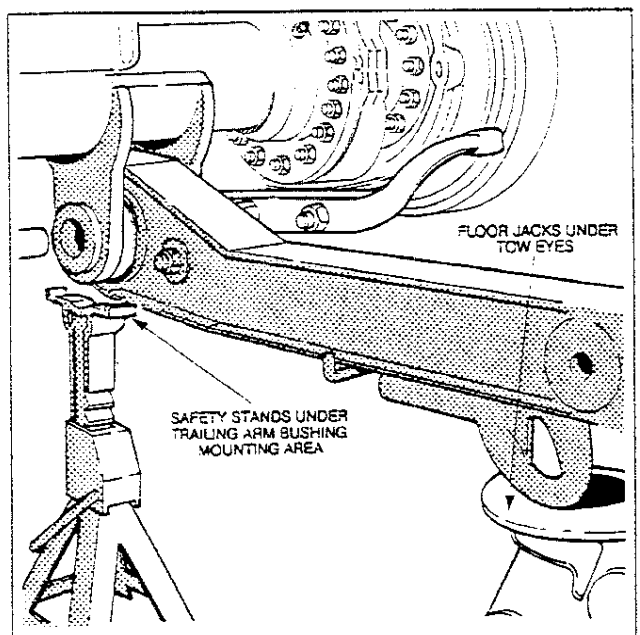
4. Raise each jack alternately so vehicle is basically level as it is being raised.

5. Raise bus to the necessary height, and place a safety stand at each side of the trailing arm bushing mounting area. See figure 00-21-1.

   NOTE: If the rear axle is not being raised and supported by stands, chock the rear wheels.

6. To lower the front of the vehicle, raise vehicle slightly using floor jacks, and remove the safety stands.

7. Slowly relieve pressure from the jacks to allow bus to lower to the ground.



FRONT AXLE SAFETY STAND AND JACK LOCATIONS

FIG. 00-21-1

RAISING AND SUPPORTING REAR OF VEHICLE USING FLOOR JACKS AND SAFETY STANDS

1. Ensure the transmission selector is in NEUTRAL, release the Parking Brakes prior to raising vehicle with jacks.

   NOTE: If system air is depleted, connect a filtered shop air supply, 70 psi minimum, to hold off rear axle spring brakes. This will also maintain air suspension system pressure.

2. Using two floor jacks, position the concave head of each floor jack under the rear skid plates. See figure 00-21-2.

   NOTE: Do not position the jacks parallel to the bus body, but rather at an angle away from the sides being raised (toward center line of the vehicle). This will allow the jacks to roll with the suspension as bus is raised.

3. Raise each floor jack until the outside edges of the lifting pad contacts the skid plate.

4. Raise each jack alternately so vehicle is basically level as it is being raised.

5. Raise bus to the necessary height, and place a safety stand under the frame area at each side of the skid plate. See figure 00-21-2.

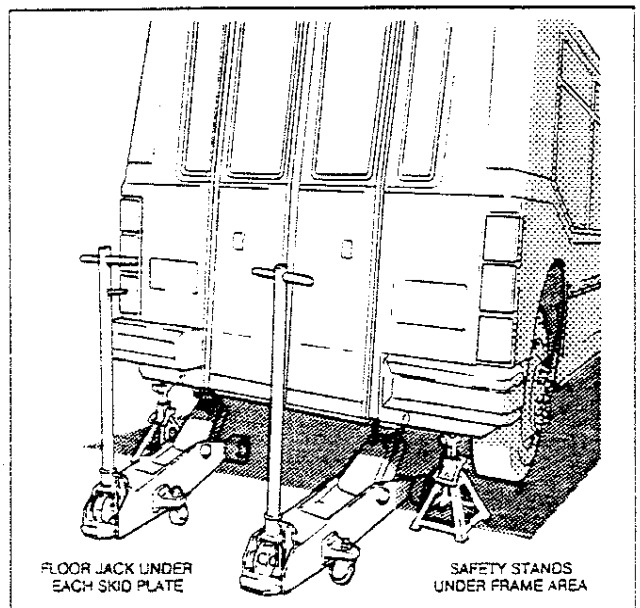
   CAUTION: Ensure safety stands do not pinch fuel lines.

6. If front axle is not being raised and supported by stands, chock the front wheels.

7. To lower the rear of vehicle, raise vehicle slightly using floor jacks, and remove the safety stands.

8. Slowly relieve pressure from the jacks to allow the bus to lower to the ground.

   NOTE: Refer to figure 00-21-3 for other safety stand positions.



REAR SAFETY STAND AND FLOOR JACK LOCATIONS

FIG. 00-21-2

HOISTING

Because of the many different types of lifting hoists used throughout the transit industry, we do not configure any specific adapter which would allow the hoist pads to contact the vehicle. Use the hoist adapters from your lifting hoist and position them according to the areas shown in figure 00-21-3.

Hoisting Procedure

1. Position bus over hoist. Position hoist posts and adapter pads so they will contact the body lifting pods or axle lifting contact areas.

2. Release the Parking Brakes.

   NOTE: If system air is depleted, either cage spring brakes or connect a filtered shop air supply, 70 psi minimum, to hold off spring brakes. This will also maintain air suspension system pressure.

3. Lift front and rear of vehicle at the same rate, maintaining correct vehicle level at all times.

4. Place safety stands under vehicle at locations shown in illustration. These will stabilize vehicle while on hoist.

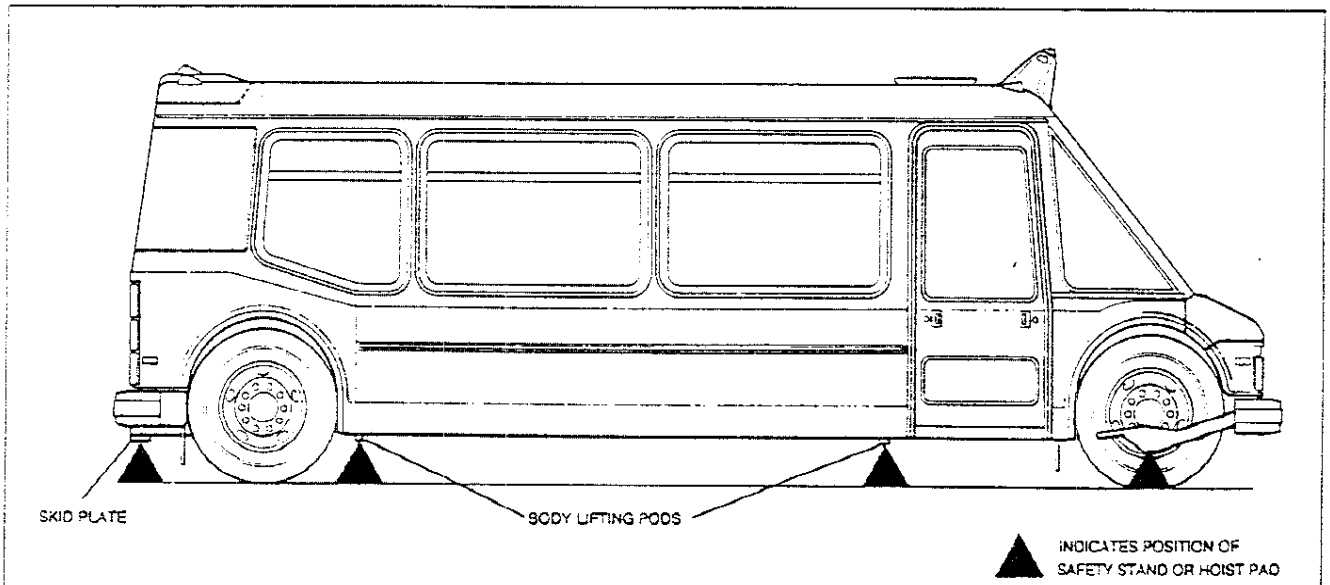
CAUTION: If vehicle is going to be left overnight on hoist, ensure safety stands are placed under vehicle at the designated areas, or a filtered shop air supply connected to vehicle. This is because vehicle suspension system may leak down overnight causing the vehicle to sag and become imbalanced, possibly causing it to fall from hoist.

Hoisting Contact Points When Preparing To Remove Power Module

When removing the power module, four lifting pods are provided under the body. These will allow a hoist to lift the body away from the module, when required.

Hoisting systems normally used to pick up on transit vehicle axles may require adjustment, or special adapters, in order for lifting arm pads to contact the body lifting pods.

CAUTION: Do not attempt to position hoist pads under any other area of the understructure, as damage will result.



SAFETY STAND AND HOIST PAD LOCATIONS

FIG. 00-21-3

TOWING

The following are the recommended procedures for towing the vehicle.

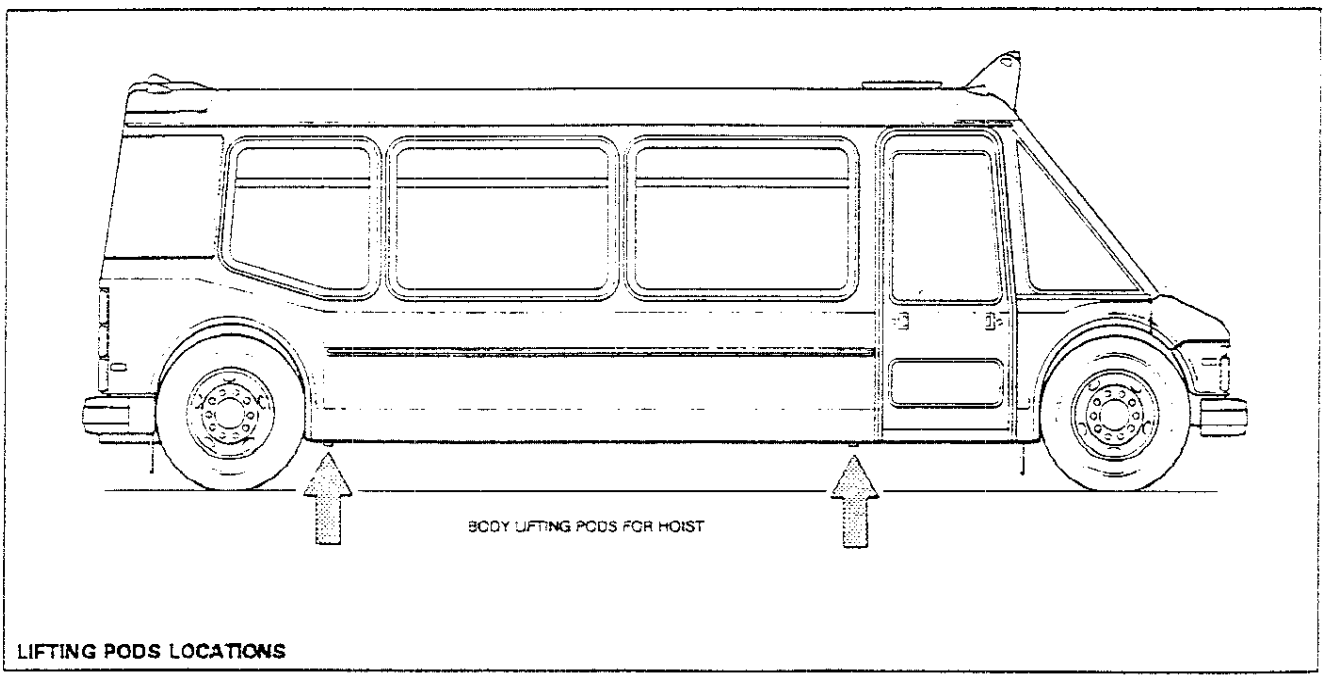
CAUTION: Take every precaution to ensure that the bus will not suffer structural damage as a result of towing. If the transit authority has its own towing procedures, compare them carefully with the following procedures.

NOTE: The engine cannot be started by pushing or towing the vehicle.

General Precautions

1. Follow all levels of government and local laws regarding such items as warning signals, night illumination, speed, etc.
2. A safety chain system completely independent of the primary lifting and towing attachments must be used.
3. Do not tow any vehicle over the 35 mph (55 km/hr) limit.
4. Secure all loose or protruding parts of damaged vehicle prior to moving.
5. Refrain from going under the vehicle which is being lifted by the towing equipment, unless the vehicle is adequately supported by safety stands.
6. Make sure towing operation does not jeopardize the safety of the wrecker, operator, bystanders, or other motorists.

WARNING: Provide an auxiliary air supply to the vehicle being towed, so that adequate air is available to hold off the spring brakes and maintain the suspension height. This air supply should be a minimum of 100 psi.



LIFTING PODS LOCATIONS

FIG. 00-21-4

Lift Towing Vehicle From The Front

1. On some vehicles prior to Serial No. 5036 removeable tow eyes were used. These are stored on the driver's front side inner wheelwell. In order to tow vehicle, remove end caps and slide tow eyes into frame channels, located between radiator grill. Secure eyes with clevis pins. On all other vehicles the tow eyes are located on the front axle trailing arms.

2. Apply the parking brakes and place a chock behind each rear wheel.

3. Locate the air filler valve from one of the following areas:
   - The driver's side grill area shown in figure 00-21-5
   - The inner drivers side wheelwell shown in figure 00-21-6
   - The quick disconnect air line at the air dryer shown in figure 00-21-7

4. Connect an auxiliary air supply to vehicle air system filler valve. Adapters may be required.

5. Insert a 1/2 in. diameter chain with a hook on each end either through each tow eye, or around each trailing arm. See figure 00-21-8.

6. Connect each hook to the first chain link that protrudes from the front of tow eye or trailing arm.

7. Place a hardwood block (approximately 6 in. by 6 in. by 4 ft. long) between the chains and the underside of the bumper. Also place a length of rubber mat or tire tread between the front face of bumper and tow rig. This will prevent cutting and scuffing of the bumper when vehicle is lifted and towed.

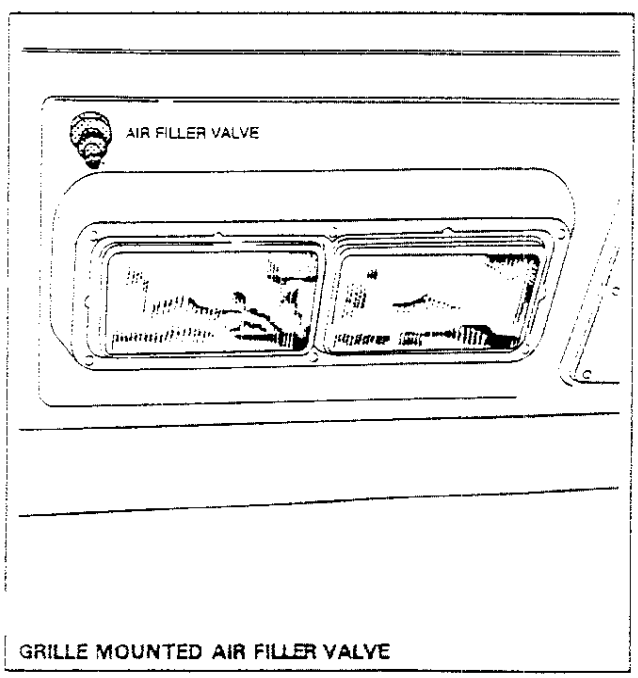
8. Attach the chains to the tow vehicle according to the transit authority's standard procedures. An additional safety chain must also be attached between the vehicles.

9. Ensure transmission selector is in NEUTRAL.

10. Release the vehicle parking brakes and remove chocks from rear wheels.

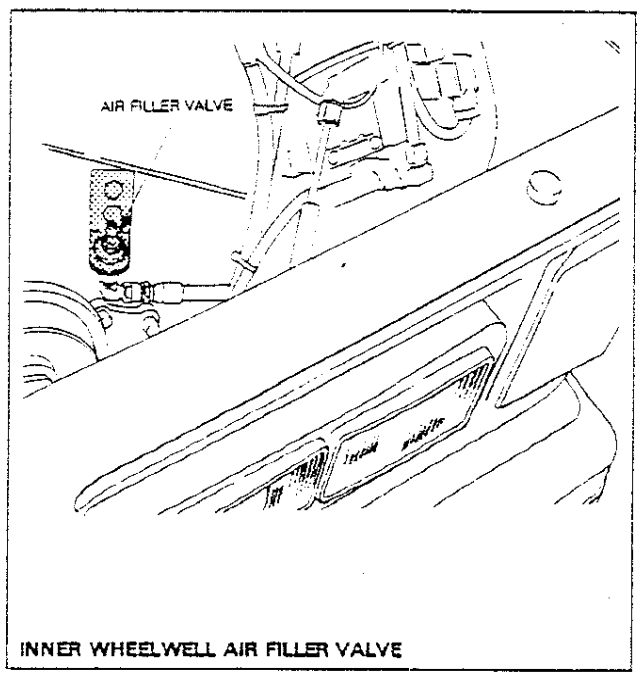
11. Raise vehicle high enough for front tires to clear the roadway (six to eight inches).

CAUTION: Do not raise bus higher than necessary.



GRILLE MOUNTED AIR FILLER VALVE

FIG. 00-21-5



INNER WHEELWELL AIR FILLER VALVE

FIG. 00-21-6

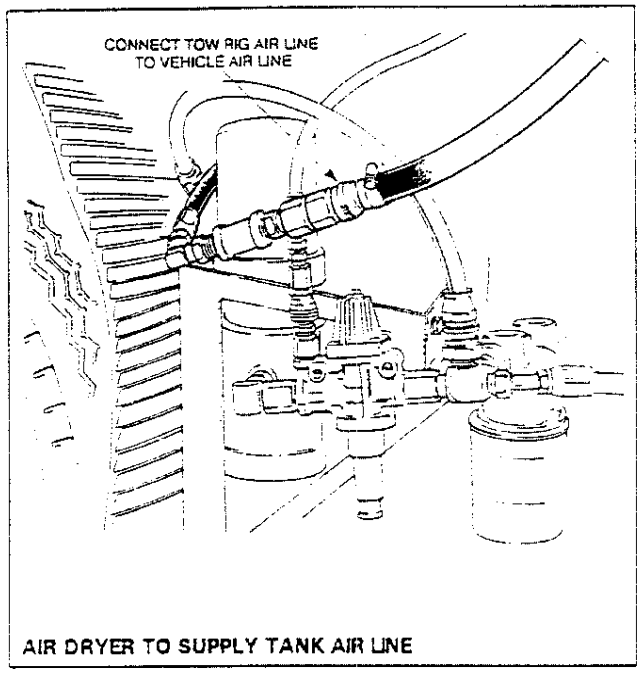


FIG. 00-21-7

Lift Towing Vehicle From The Rear

NOTE: Prior to Serial No. 5087 tow eyes located below the rear bumper were only provided for emergency use, such as winching the bus out of a ditch. They are not to be used to lift and tow vehicle.

Buses built after Serial No. 5086 are equipped with tow eyes that can be used to lift and tow vehicle, although, the driveshaft between transfer case and transmission must be removed, and the steering wheel locked or tied to prevent excessive movement. All other safety precautions must be practiced, as in lifting and towing vehicle from the front.

NOTE: If the auxiliary air connection will not release the rear axle spring brakes (Parking Brakes) the chambers may have to be manually caged by the tow truck operator.

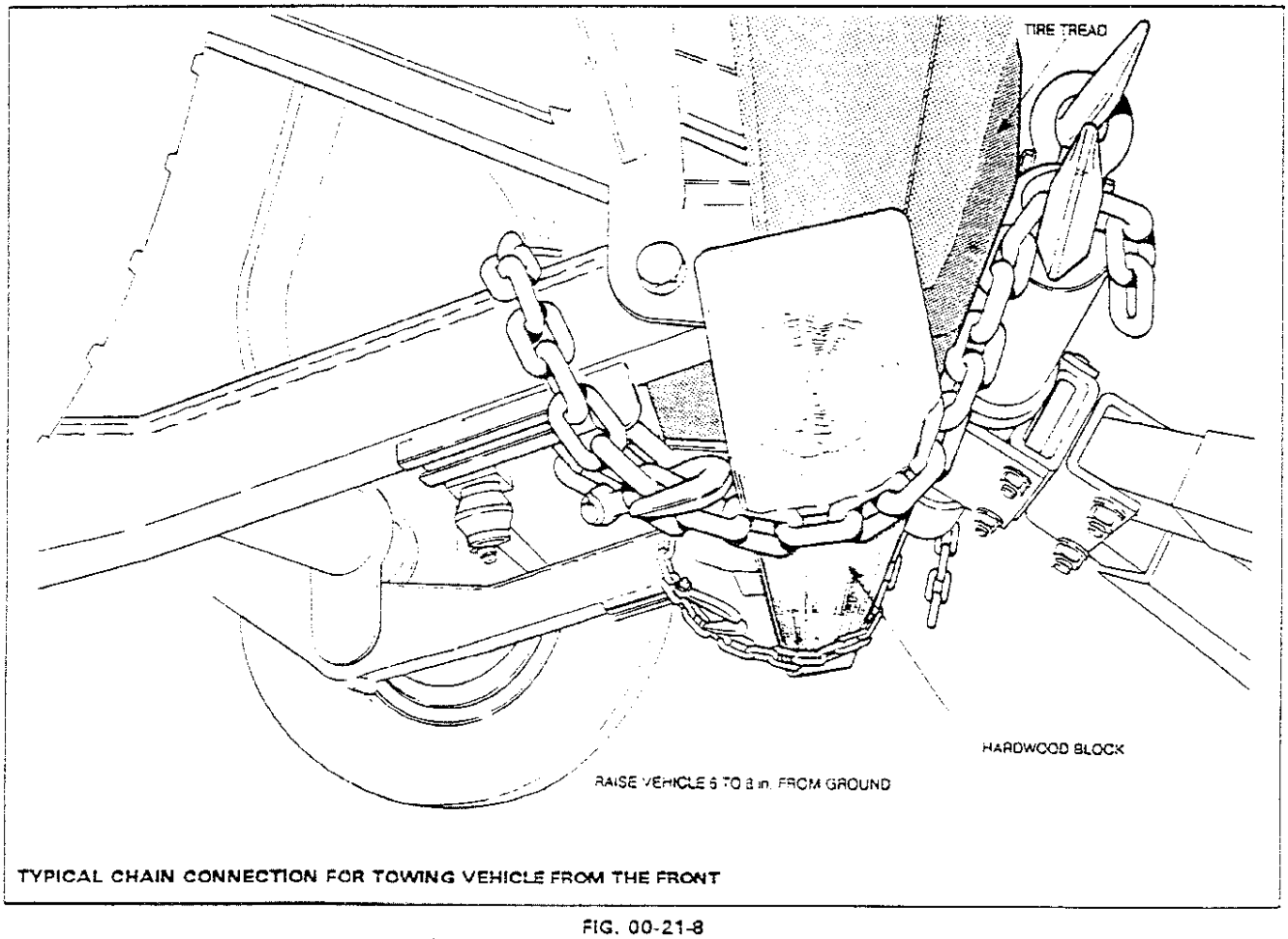

TIRE TREAD
HARDWOOD BLOCK
RAISE VEHICLE 6 TO 8 in. FROM GROUND
TYPICAL CHAIN CONNECTION FOR TOWING VEHICLE FROM THE FRONT

FIG. 00-21-8

Orion V

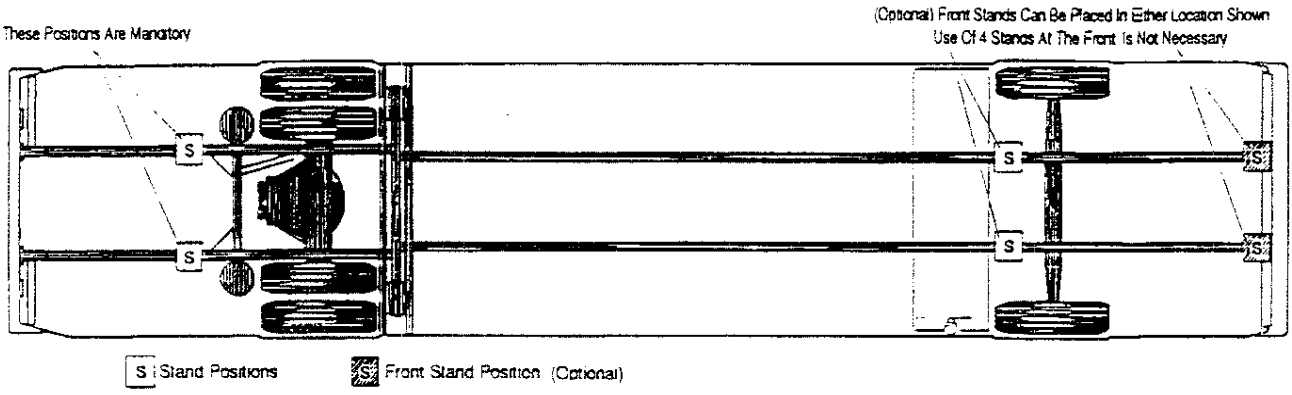


Figure 9 Safety Stand Positions

Hoisting Procedure

Warning

Do not allow individuals to board the vehicle, and do not run the engine or engage the transmission while the vehicle is being lifted by a hoist. Do not position safety stands under the walking beam.

1. Place the bus over the hoist and position the front hoist adapters such that they will contact the front axle jacking pads (see Figure 10). Position the rear hoist posts such that they will contact the rear axle as far outboard as possible (see Figure 11).

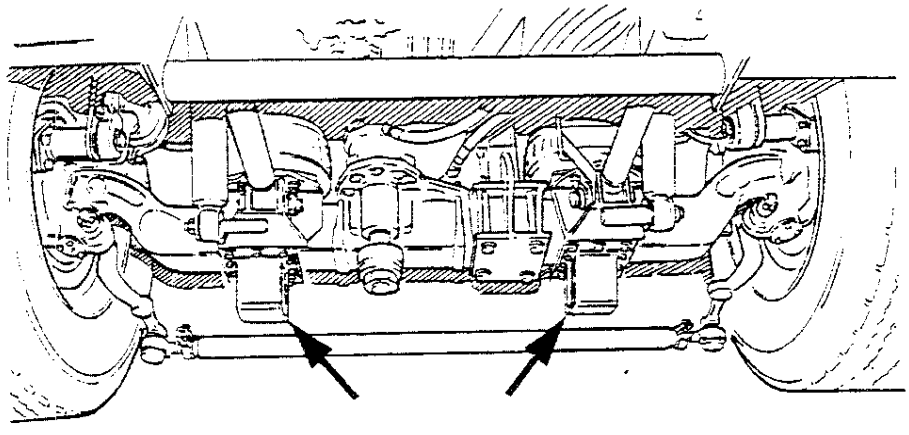


Figure 10 Front Jacking Pads

2. Raise the hoist posts so that contact is made. Do not lift the vehicle.
3. Release the parking brake.

Note

If system air is low, connect a filtered auxiliary air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain the air pressure in the suspension system.

4. Always inspect the hoist area, and make sure that nothing will interfere with, or cause damage to, the bus.

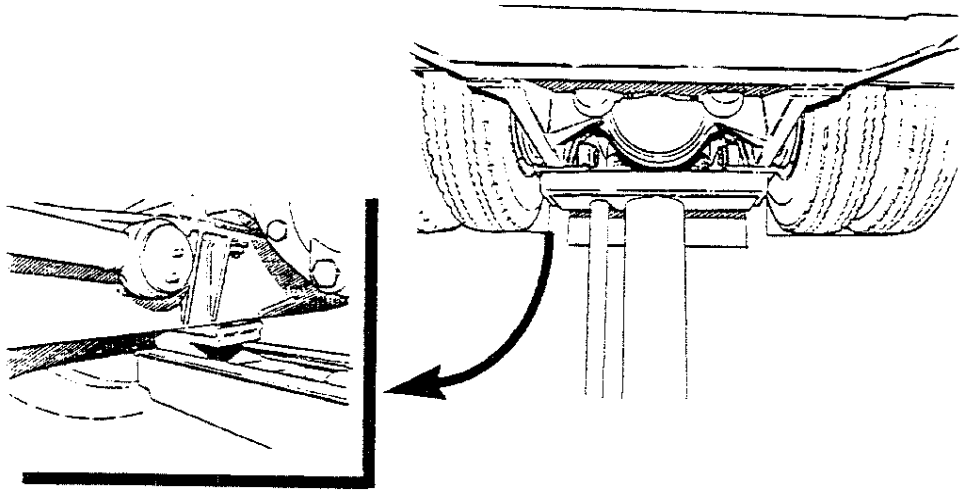


Figure 11 Typical Rear Hoist Placement

5. Ensure that the hoist adapter pads are still properly located and secured, and then lift vehicle.
6. Lift the front and rear of vehicle at the same rate, maintaining correct level at all times.
7. Engage hoist safety locks.
8. Position four safety stands under the vehicle as previously shown in Figure 9.

Caution ***Ensure that the safety stands firmly contact the bus main frame rails and do not interfere with the operation of the vehicle's suspension. Do not lower the hoist after the bus has been supported by the safety stands. These are required to support the vehicle's suspension system. Do not allow the axles to hang unsupported.***

Towing

Note *You cannot start the engine by pushing or towing the vehicle.*

General Precautions

Caution ***Exercise the following precautions when towing the vehicle:***

- Make sure that vehicle towing complies with all state, provincial, and local laws. These laws govern the required use of warning signals, night illumination, and speed limits.
- A safety chain system that is completely independent of primary lifting and towing attachments, must be used.

- Never tow a vehicle over 35 mph (55 km/hr).
- Refrain from going under a vehicle that is being lifted, unless the vehicle is properly blocked and supported.
- Do not attempt any towing operation which might jeopardize the safety of the operator, by-standers, or other motorists.
- Secure all loose or protruding parts of damaged vehicles prior to moving.

Caution ***Provide a minimum auxiliary air supply of 70 psi to the vehicle being towed. This allows adequate air to hold off the spring brakes and to maintain the suspension height.***

Caution ***When towing the vehicle from the front, remove both of the rear axle shafts to prevent damage to the power train components. To prevent damage to the unit, cover the axle shaft openings to prevent loss of lubricant and inhibit the entrance of foreign material.***

Front Towing with a Tow Bar

The Orion vehicle is equipped with two tow eyes above the front bumper (see Figure 12). The tow bar must be attached to the front tow eyes and secured with clevis pins (Figure 13). A pintle ring hook is used to secure the tow bar to the towing vehicle.

When towing the vehicle from the front with the tow bar, always ensure that:

- the necessary safety precautions are observed,
- connecting devices are engaged,
- a secondary fastening system is secure.

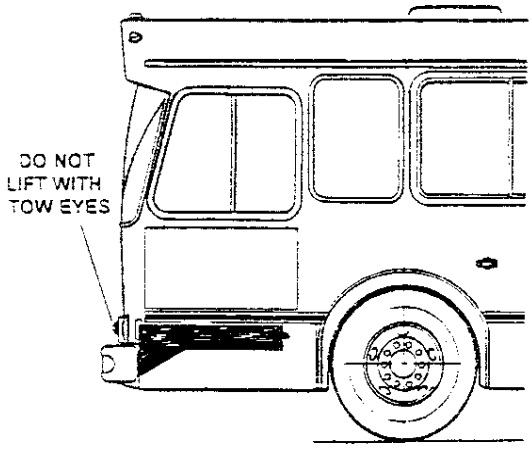


Figure 12 Front Towing

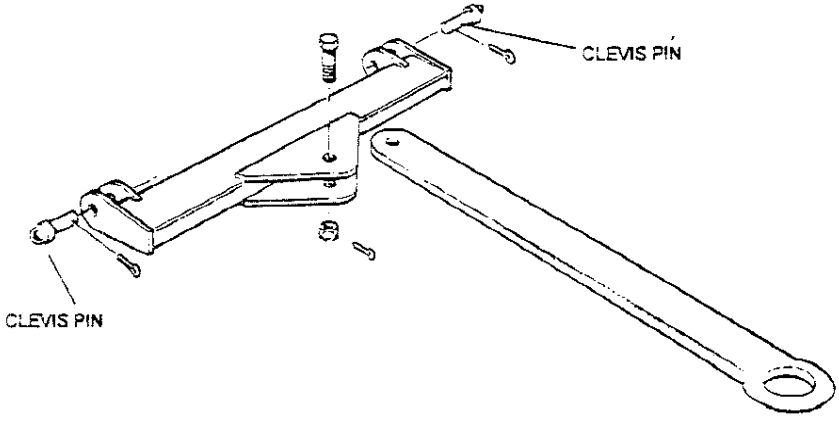


Figure 13 Tow Bar

't Towing from the Front

1. Apply the parking brakes and place a chock behind each of the rear wheels.
2. Locate the front auxiliary air filler valve behind the windshield washer fill door as shown in Figure 14.

Caution ***The two tow eyes above the front bumper are provided for use with a tow bar only. Do not lift the vehicle by the tow eyes.***

3. Connect the auxiliary air supply to air filler valve of vehicle.

Note ***A standard filler valve is also located in the engine compartment, on the bulkhead, adjacent to hydraulic tank. This valve is accessible through the curb side access door (see Figure 15).***

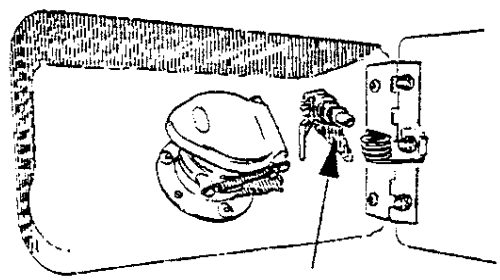


Figure 14 Front Auxiliary Air Valve

4. Wrap a suitable chain (i.e., required length and capacity) around the radius rods of the axle as shown in Figure 16.
5. Place a hardwood block (approximately 6 in. by 6 in. by 4 ft.) between the chains and underside of the bumper. Also place a length of rubber mat, or tire tread, between the front face of the bumper and the tow rig. This will prevent cutting and scuffing of bumper when vehicle is lifted and towed.

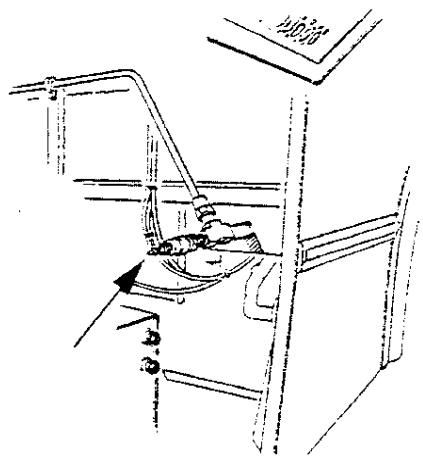


Figure 15 Rear Auxiliary Air Valve

6. Attach chains to tow the vehicle according to transit authority's standard procedures. Attach a safety chain between vehicles.
7. Ensure that the transmission selector is in the *Neutral* position, and that the rear axle shafts are removed and properly stowed.

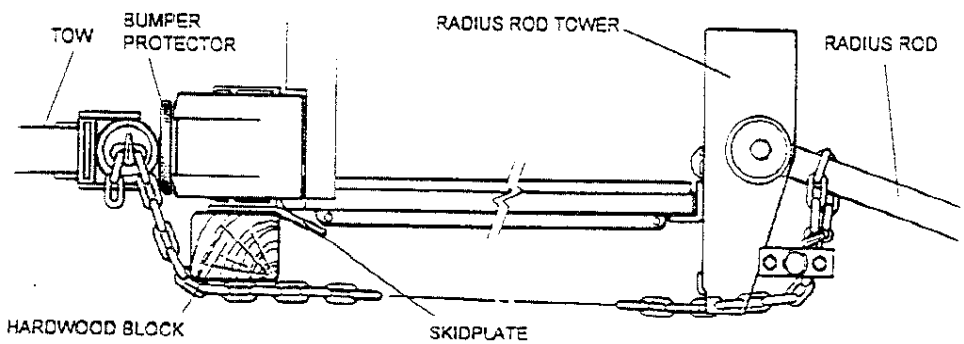


Figure 16 Lift Towing From the Front

Caution ***Towing the vehicle while the rear axle shafts are still connected will cause damage to the transmission.***

8. Release the vehicle parking brakes and remove the chocks from the rear wheels.
9. Raise the vehicle just high enough (approximately 6 to 8 inches) for front tires to clear roadway.

Caution ***Do not raise the vehicle higher than necessary.***

Lift Towing from the Rear

The recommended procedure when lift towing from the rear is to use the lifting arm of a tow truck or similar vehicle (see Figure 17).

Additional precautions to be followed during this activity include:

- Ensure that the vehicle bumper is protected if the lifting arm claws or structure make contact with it during the lift.
- Secure the steering wheel to minimize the movement of the front of the vehicle.
- Do not remove the axle shafts if rear wheels are not expected to contact the ground.

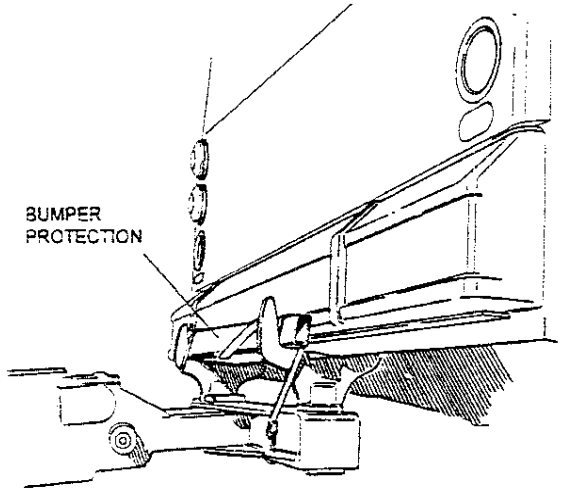


Figure 17 Lift Towing From the Rear

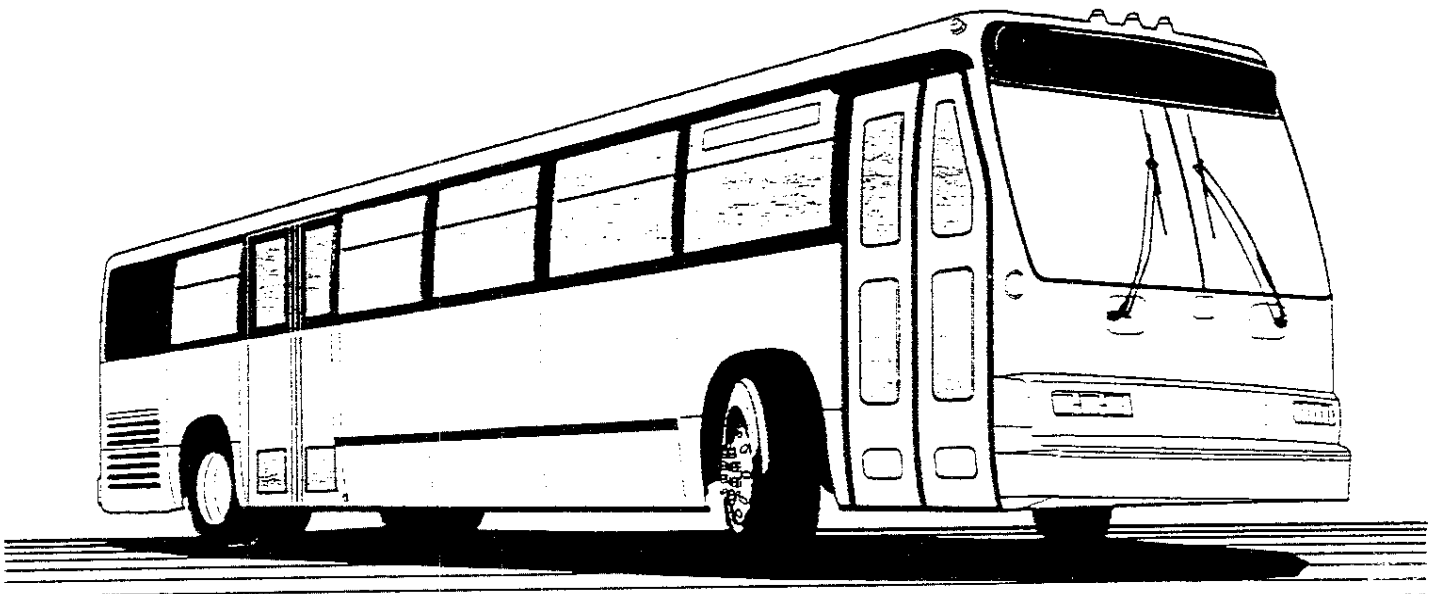
Caution ***Do not raise the vehicle higher than necessary. Have a second person check the clearance between the wheelchair lift and the ground while the vehicle is being raised.***

Nova RTS

OCTOBER 1998

MAINTENANCE MANUAL

NOVA RTS



NOVA RTS (#7200-7251)

VEHICLE ENGINEERING
SURFACE
Engineering File
1260

MODEL T80206 WFD

Prepared for
Basic RTS '06 Wide Front Door Units

RTS

Nova BUS

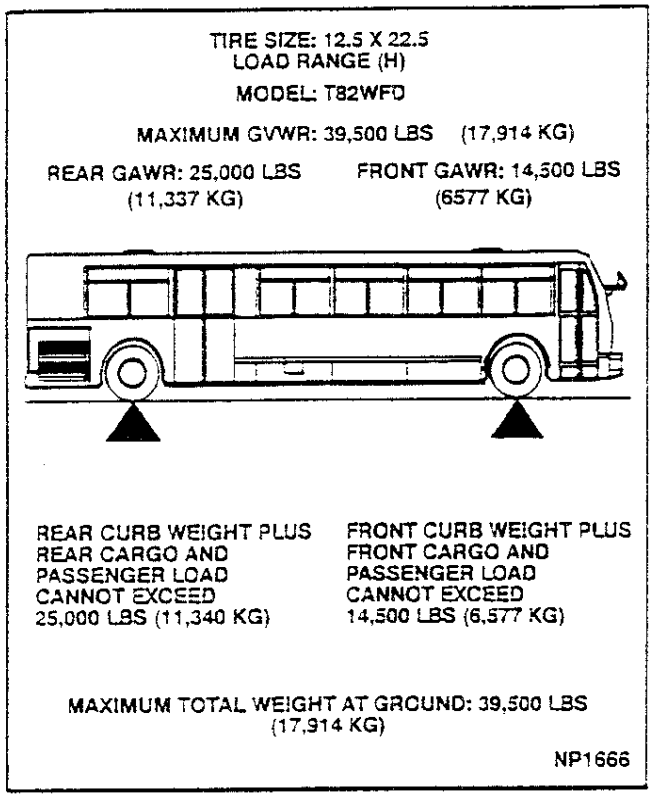
NOVA BUS INCORPORATED
ROSWELL, NEW MEXICO 88201

VEHICLE LOADING INFORMATION

OVERLOADING

CAUTION

- Bus components are designed to provide satisfactory service if it is not loaded in excess of either the Gross Vehicle Weight Rating (GVWR) or the maximum front and rear Gross Axle Weight Ratings (GAWRs). These ratings are shown on the bus Certification Label.
- Overloading can create serious potential safety hazards. It can also shorten the service life of the bus. Your local RTS Bus Service Engineer can advise you concerning proper loading conditions of the bus.


TIRE SIZE: 12.5 X 22.5
LOAD RANGE (H)
MODEL: T82WFD
MAXIMUM GVWR: 39,500 LBS (17,914 KG)
REAR GAWR: 25,000 LBS (11,337 KG)
FRONT GAWR: 14,500 LBS (6577 KG)
REAR CURB WEIGHT PLUS REAR CARGO AND PASSENGER LOAD CANNOT EXCEED 25,000 LBS (11,340 KG)
FRONT CURB WEIGHT PLUS FRONT CARGO AND PASSENGER LOAD CANNOT EXCEED 14,500 LBS (6,577 KG)
MAXIMUM TOTAL WEIGHT AT GROUND: 39,500 LBS (17,914 KG)
NP1666

MAXIMUM FRONT AND REAR AXLE WEIGHTS

The weight of the passengers must be properly distributed over both the front and rear axles. The Certification Label shows the maximum weight that the front axle (front GAWR) and rear axle (rear GAWR) can carry. The GVWR represents the maximum permissible load weight of the vehicle and takes into account the engine, transmission, suspension, brake, axle and tire capabilities. Actual loads at the front and rear axles can only be determined by weighing the vehicle. This can be done at highway weigh stations or other similar facilities. For assistance in this area consult your RTS Bus Service Engineer. Care should be exercised to see that the passenger load is distributed on both sides of the bus as equally as possible. Typical vehicle loading information for factory-supplied tires is shown in figure 7 and the following table. Consult tire manufacturer for information to customer-supplied tires as delivered.

LOAD CAPACITY CHART (ALL BUS MODELS)

			AIR PRESSURE				GVWR		GAWR			
			FRONT		REAR				FRONT		REAR	
TIRE SIZE	RIM SIZE	LOAD RANGE	PSI	kPa	PSI	kPa	LBS	KG	LBS	KG	LBS	KG
305/85R	22.5 X 8.25	H	115	792	105	689	39,500	17,914	14,500	6,577	25,000	11,337

GENERAL DATA

This table lists general information on bus models covered by this manual. Refer to "SPECIFICATIONS" at the end of each section or subsection for specific data and specifications.

MODEL DATA

VEHICLE LENGTH (MAXIMUM)
T80206 ..... 40 Feet (1220 Centimeters)

VEHICLE HEIGHT (MAXIMUM)
T80206 ..... 122 Inches (3099 Millimeters)

VEHICLE WIDTH
T80206 ..... 102 Inches (2591 Millimeters)

TURNING RADIUS (FRONT OUTER TIRE)
T80206 ..... 39 Feet (1189 Centimeters)

TURNING RADIUS (FRONT BODY CORNER)
T80206 ..... 44 Feet (1342 Centimeters)

WHEELBASE
T80206 ..... 298.7 Inches (7587 Millimeters)

TRACK (FRONT)
T80206 ..... 86.8 Inches (2205 Millimeters)

TRACK (REAR)
T80206 ..... 76.5 Inches (1943 Millimeters)

TIRES SIZES (STANDARD)
T80206 ..... 12.50 x 22.5

FUEL TANK CAPACITY (APPROXIMATE)
Standard Diesel ..... 125 Gallons (475 Liters)
CNG (nominal) ..... 15,000 SCF (427 m^3)

COOLING SYSTEM CAPACITY (INCLUDES HEATING SYSTEM)
Approximate ..... 90 Quarts (94.5 Liters)

ENGINE CRANKCASE CAPACITY
With Series 50 Engine ..... 25 Quarts (23.75 Liters)

TRANSMISSION CAPACITY (APPROXIMATE)
System Fill (After Overhaul) ..... 36 Quarts (34 Liters)
Refill (After Draining) ..... 26 Quarts (25 Liters)

STEERING SYSTEM CAPACITY
Without Rear Wheelchair Lift ..... 6.5 Quarts (6.2 Liters)

REAR AXLE CAPACITY
Rockwell Axle ..... 22 Pints (10.5 Liters)

ENGINE DATA
REFER TO THE ENGINE APPLICATION CHART AT THE END OF SECTION 6A FOR ENGINE DATA.

JACKING AND TOWING

⚠ WARNING ⚠

TO REDUCE THE POSSIBILITY OF PERSONAL INJURY:

1. Never get beneath the bus when it is supported only by a jack.
2. Position the bus on a hard, level, flat surface before jacking.
3. Place the transmission shift selector in Neutral "N" position and apply the parking brake.
4. Do NOT start or run the engine when the bus is supported by a jack.
5. Block or chock the front and rear of the wheel on the opposite side of the bus being raised to help prevent the bus from moving.
6. Use a floor jack only for lifting the bus, and always block the body after the bus has been raised.
7. The floor jack must meet or exceed the minimum requirements specified under "RAISING AND LOWERING THE FRONT OF THE BUS" or "RAISING AND LOWERING THE REAR OF THE BUS" later in this section.
8. The floor jack must be located as indicated in figures 8 and 11 to prevent the possibility of the jack sliding from under the bus.
9. If removing a flat tire, raise the bus sufficiently to install an inflated spare.

RAISING AND LOWERING THE FRONT OF THE BUS

NOTE: A floor jack with a minimum rating of 10 tons and having a minimum 8-inch diameter lifting pad with a minimum 4 3/4-inch spacing between the ears, is recommended to be used to raise and lower the bus.

1. Set HAZARD switch to ON to energize hazard warning lights.
2. If the bus has a flat tire, drive wheel with flat onto a standard 6-in. run-up block to aid in placing a jack.
3. Apply parking brake and place transmission selector in neutral "N" position.
4. Refer to figure 8 and position the concave head of floor jack under front axle to lower radius rod attachment. DO NOT position jack parallel to bus body. Position at an angle, away from side being raised and toward centerline of bus so it can move with the suspension as bus is raised. If bus is equipped with optional front jacking pads, position jack under pad.
5. Raise jack until center of lifting pad contacts axle to lower radius rod attachment, or optional front jacking pad, if so equipped.

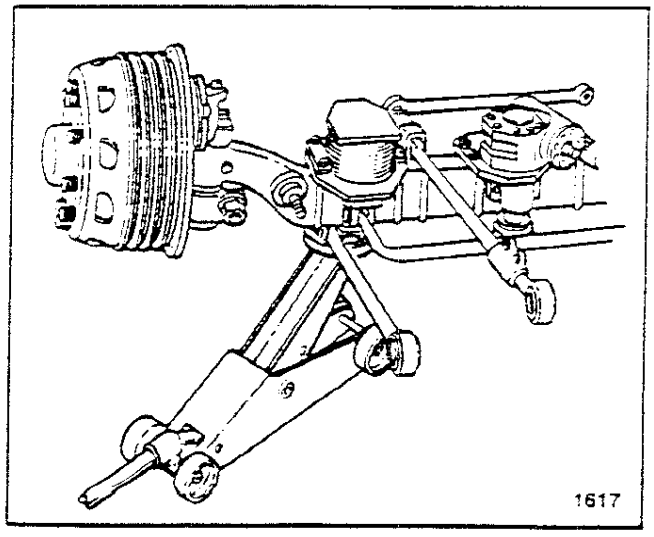


Figure 8 - Front Jack Placement

⚠ WARNING ⚠

To reduce the possibility of personal injury, position one safety block under the front bulkhead, behind the entrance door (fig. 9) before starting to raise the bus. Then, add additional safety blocks as the bus is being raised.

6. Position safety block under front bulkhead.

7. Raise jack to desired height and insert additional safety block(s) to help support the bus and retain it at that height if jack pressure is accidentally released.

8. To lower bus, remove safety and run-up blocks and slowly relieve pressure from jack.

RAISING AND LOWERING THE REAR OF THE BUS

NOTE: It is recommended that a floor jack with a minimum rating of 10 tons and having a minimum 8-inch diameter lifting pad with a minimum 4 3/4-inch spacing between the ears be used to raise and lower the rear of the bus.

⚠ WARNING ⚠

To reduce the possibility of personal injury, position a safety block under the the bulkhead, forward of the rear wheels, to support the bus when the rear is being raised. Be careful not to damage the wheelchair lift or battery box. Add a final block after the bus is raised to the desired height to prevent the bus from lowering if pressure is accidentally released from the jack.

⚠ WARNING ⚠

To reduce the possibility of personal injury, never get beneath the bus after the jack has been positioned. Always position safety blocks under the rear axle bulkhead ahead of the rear wheels, as shown in figure 10, to support the bus when the rear is raised.

1. Set HAZARD switch to ON to energize hazard warning lights.

2. If bus has a flat tire, drive wheel needing removed onto a standard 6-in. run-up block to aid in placing a jack.

3. Apply parking brake and place transmission selector in neutral "N" position.

4. Refer to figure 11. Position jack's lifting pad ears to straddle the 4-1/2 inch wide engine cross member. Position pad on horizontal flat portion of engine cross member, as far forward and as close to engine centerline as possible. Jack lifting pad should be about 33 inches in from lower portion of rear bumper. Then push jack under the bus at a slight angle to clear rear tow eye. Alternatively, the jack pad welded to the rear of the axle spring beam may be used if accessible by the jack.

5. If changing a wheel with a flat tire, remove 6-in. run-up block.

6. Raise jack to desired height and insert additional safety block(s) as shown to help support bus and retain it at that height if jack pressure is accidentally released.

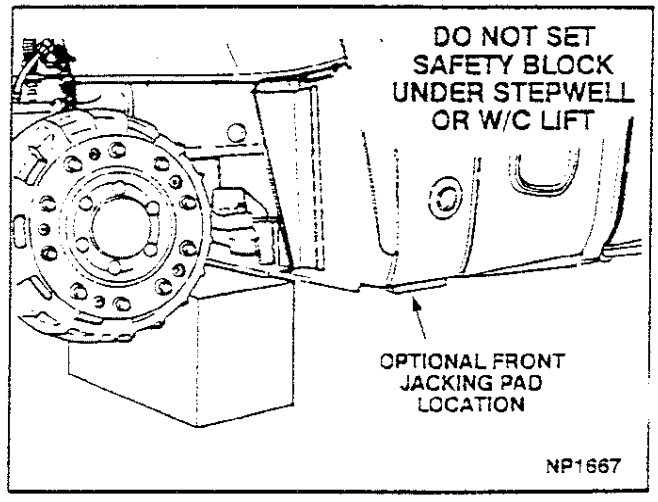


Figure 9 - Front Safety Block Placement

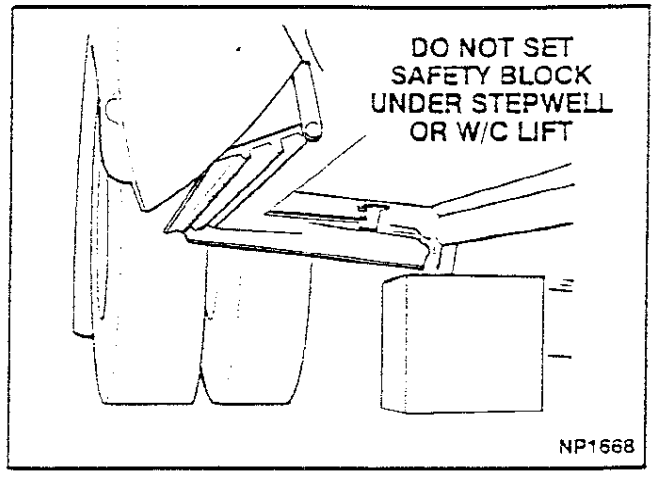


Figure 10 - Rear Safety Block Placement

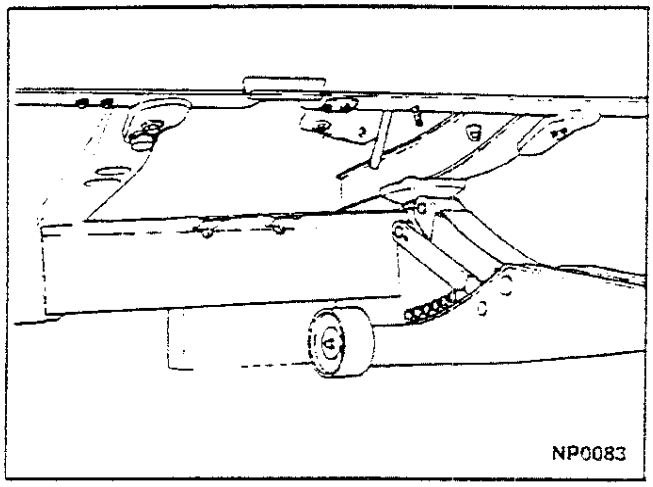


Figure 11 - Rear Jack Placement

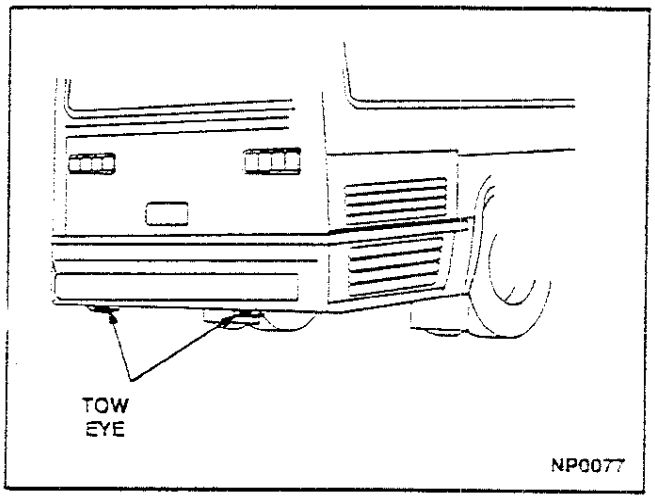


Figure 12 - Rear Tow Eye Placement

⚠ CAUTION ⚠

When lowering the bus, slowly release pressure from the jack. If pressure is released too quickly, the bus may be lowered onto the base of the jack, possibly damaging the engine or transmission oil pan. Whenever the bus is raised above the normal ride height, air pressure is released from the bellows. When the bus is lowered to normal ride height air is supplied to the bellows slowly. The bus should not be lowered below the normal ride height until air pressure in the bellows can maintain the bus at the normal height. It may be necessary to start the engine to build up enough air pressure to maintain normal ride height before continuing to lower the jack.

7. To lower the bus, remove safety blocks and slowly release pressure from jack.
8. Carefully remove jack from under bus.

TOWING

TOWING RECOMMENDATIONS

⚠ CAUTION ⚠

Under no circumstances should the bus be towed without first removing the axle shafts. This is required to prevent serious damage to the transmission and other important drive line and power plant components. It is also recommended that the axle shaft opening be covered to prevent loss of lubricant and to prevent the entrance of dirt or other foreign matter.

SPECIAL TOWING INSTRUCTIONS

⚠ WARNING ⚠

To avoid possible injury, do NOT go under a bus that is being lifted by towing equipment unless the bus is properly blocked and supported.

- All state and local laws applicable to buses in tow must be followed. These include regulations on such items as warning signals, night illumination, speed, etc.
- A safety chain completely independent of the primary lifting and towing attachment must be used.
- Never tow the bus over 35 miles per hour (55 kilometers per hour).
- Loose or protruding parts of a damaged bus should be secured prior to towing.
- No towing operation which is unsafe in any way for the towing vehicle, operator, bystanders or other motorists should be attempted.
- An auxiliary air supply of 100 psi should be provided for the bus while it is being towed so adequate air is available to operate the bus brakes in the event pressure in the reservoirs is depleted.

TOWING THE BUS FROM THE REAR

Two tow eyes, located beneath the rear bumper, are bolted to the engine cradle, as illustrated in figure 12. The two eyes can be used to flat tow the bus from the

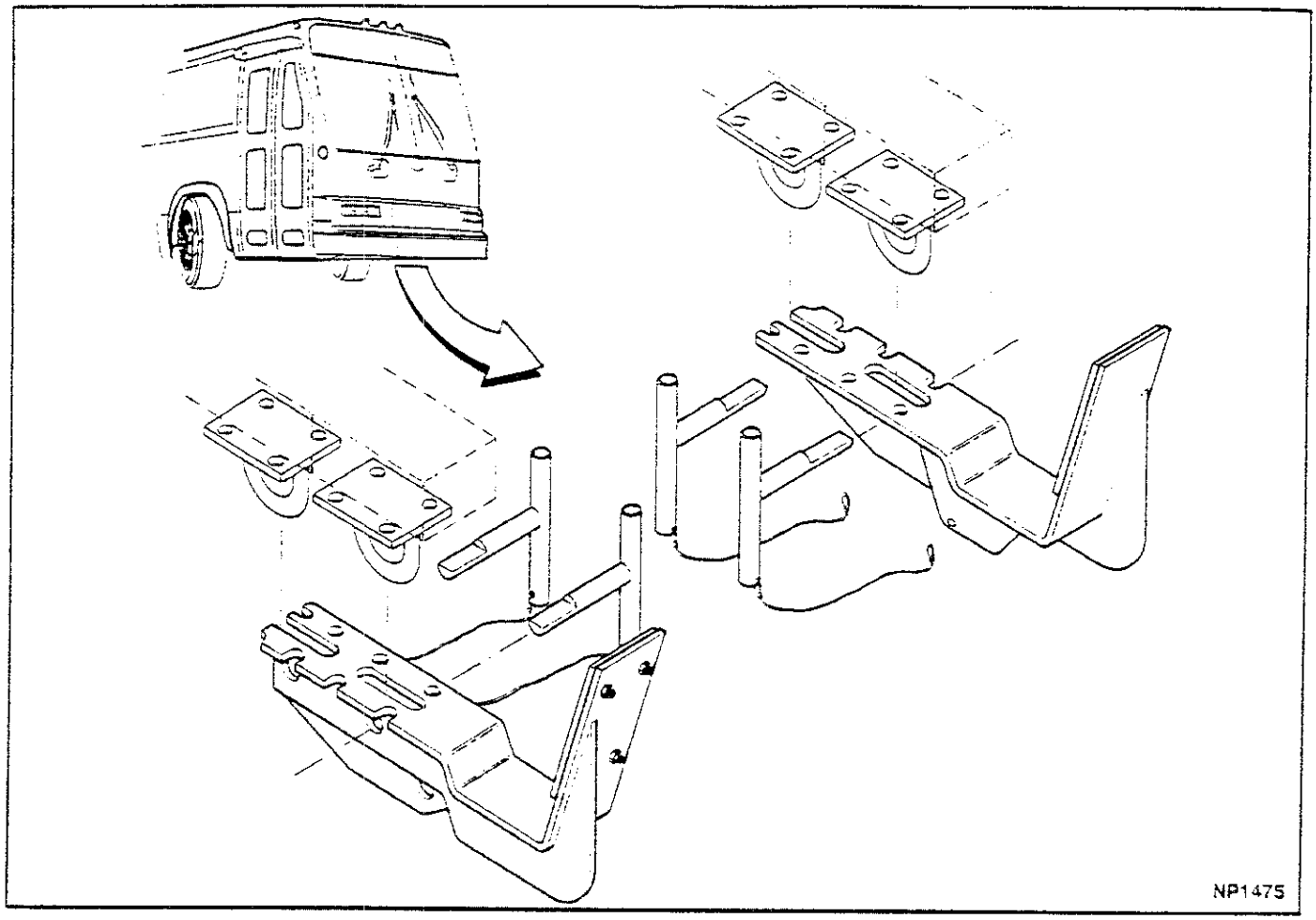


Figure 13 - Front Tow Adapters

rear. It is recommended that flat-towing the bus from the rear be limited to moving the bus from areas where it would be difficult or unsafe to retrieve it by towing from the front. When it is moved to a sure location, front towing should be used.

> **⚠ CAUTION ⚠**
>
> The bus should not be lifted when being towed from the rear. An equalizer sling or bar must be used between the tow eyes to help prevent damage to the bus while it is being towed from the rear.

TOWING THE BUS FROM THE FRONT

A Wide Front Door towing adapter set (fig. 13) (P/Ns G9000625 and G9000625-001) should be used when towing from the front.

Installing LT-183 Towing Adapter

1. Position a towing adapter (fig. 14) under the front of the bus, parallel to the front extension beams.

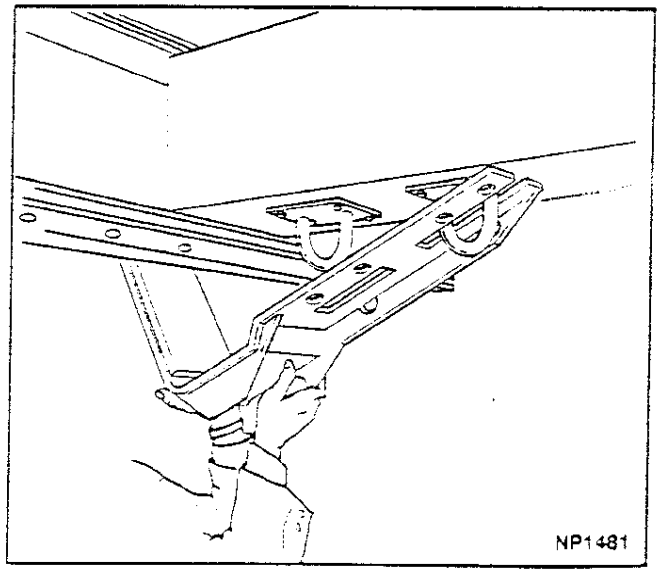


Figure 14 - Positioning Tow Adapter

2. Raise the towing adapter until the tow eye protrudes through the slot in the adapter.

3. While holding the adapter in place, insert the L-shaped locking pin through the tow eye.

4. Repeat this procedure to install the other adapter.

5. Insert the retaining pins into the ends of the locking pins.

6. Secure front axle at normal ride height by looping a chain around the axle and the upper shock absorber mounting. The chain must be inboard of the shock absorber.

7. Secure the tow vehicle to the adapters (fig. 15).

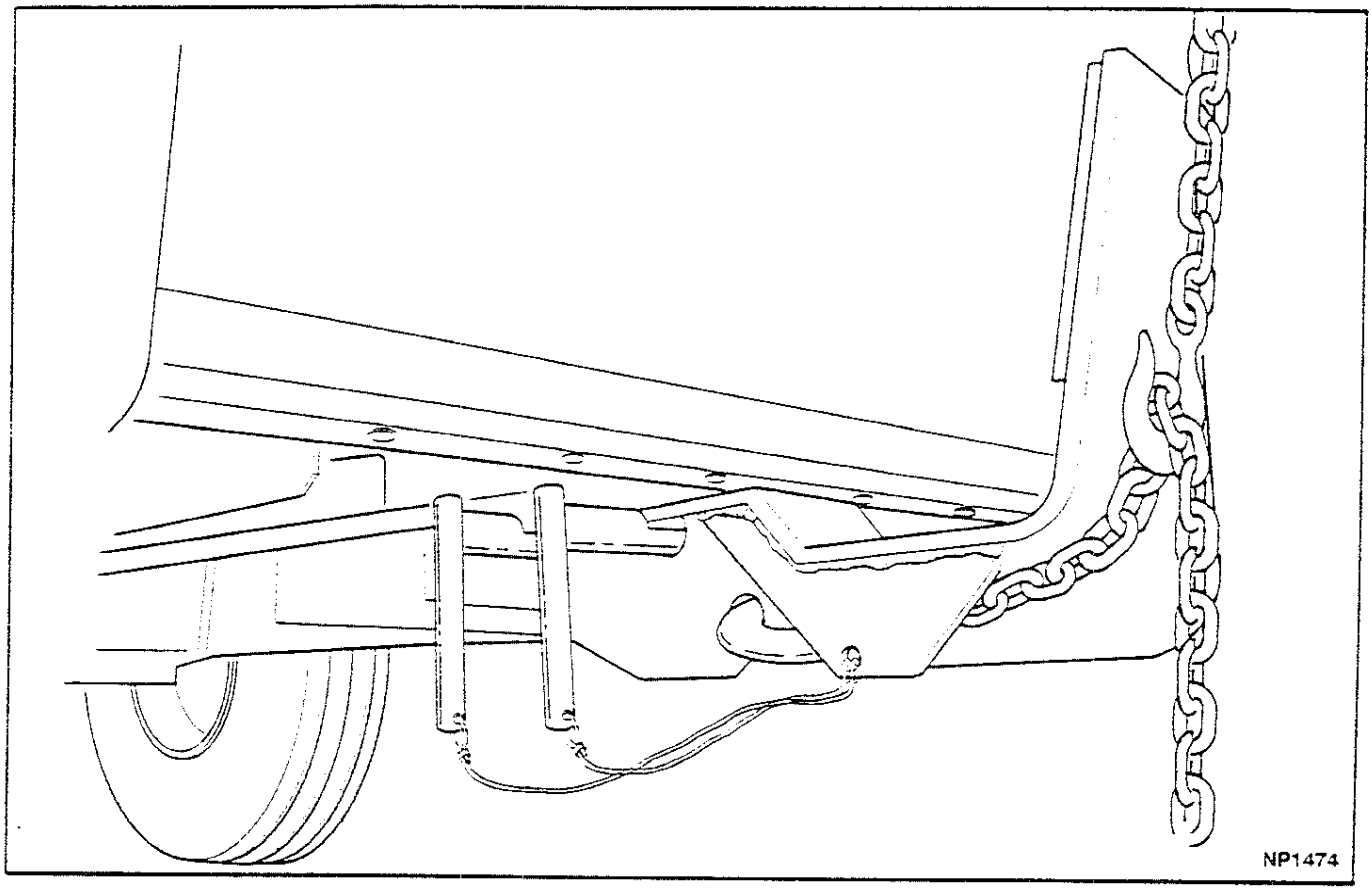


Figure 15 - Attaching to Tow Vehicle

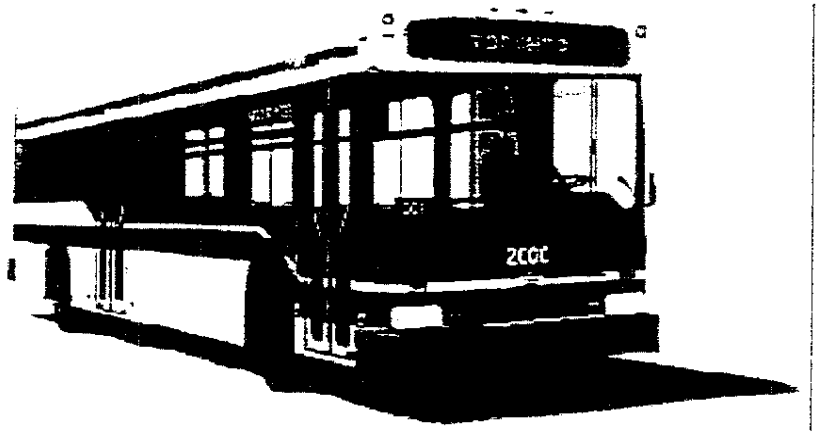
New Flyer D40 LF

NEW FLYER

TORONTO TRANSIT COMMISSION

SERVICE MANUAL

DIESEL 40FT. LOW FLOOR TRANSIT BUS



This service manual is effective for only those coaches with the following Identification Numbers:

Vehicle Identification Numbers	Unit Number
2FYD2LL05WU018294	2000

FLYER D40 LF

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1. SAFETY

1.1. Safety Procedures

This section of the service manual contains procedures which require the mechanics to strictly observe safety procedures in order to ensure personal and equipment safety.

Always ensure that the vehicle is appropriately hoisted and blocked for procedures which require elevating the vehicle. Be aware of the limitations of the blocking equipment, and always ensure that the jarring and shaking created by component removal and installation procedures does not overload the blocks, or cause the vehicle to become unstable.

Certain procedures may require the vehicle be operated in an elevated position in order to accurately troubleshoot and diagnose a problem. If the vehicle must be running while elevated, become familiar with the repair area prior to starting the engine. Take special care in noting areas which will become hot, electrically energized, and areas where moving and rotating components are located. Limit the work in these areas as personal and equipment safety is at risk.

For procedures which involve air lines, ensure the line is safely de-pressurized prior to disconnecting. Disconnecting pressurized lines will cause solid particles deposited in the line to be uncontrollably propelled, and will also cause the hose end to whip randomly as the air escapes.

During electrical diagnosis procedures an understanding of the vehicle's electric circuits is important to anticipate the results of connecting test equipment. During component removal or installation, ensure the Battery Disconnect switch is in the OFF position.

Failure to follow this procedure may result in personal injury or component failure.

Observe the following procedures involving hydraulic line removal.

- ❒ Hydraulic fluid is corrosive and should not be exposed to skin for extensive periods of time.
- ❒ Wear eye protection at all times.
- ❒ Pressurized lines should not be disconnected until the pressure is safely and controllably released.

⚠ CAUTION:

Follow all proper safety precautions regarding spray painting. Use a filtering mask with the proper filter cartridges for this type of paint. Wear eye protection and proper protective clothing. The paint booth or work area must be properly ventilated, with filtered exhaust fans removing fumes and over spray. Air make-up induction fans should also be used to supply fresh air to the work area. The painting area should be a safe distance from any source of flame, spark or other means of combustion. Atomized paint, thinner, cleaner and solvent fumes are highly volatile with an extremely low flashpoint that can cause explosive combustion. Do not smoke or permit anyone else to smoke in or near the painting area.

1.2. Insulation Foam Safety

⚠ WARNING:

Insulation foam is installed in the spaces of the frame tubing, between the vehicle inner and outer wall panels. The Insulation Foam is extremely combustible. KEEP OPEN FLAMES AND FLAME SOURCES AWAY FROM THE INSULATION FOAM!

Before performing any work or repairs requiring use of an open flame such as: welding, brazing, acetylene torch cutting or grinding, ensure that the Insulation Foam is either removed from the area being repaired, or is properly shielded from the open flame.

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2. VEHICLE SPECIFICATIONS

ENGINE & FUEL	
Engine	*Detroit Diesel* Series 50
Horsepower	275 HP-890 ft-lb.
Fuel	No. 1 Diesel
Fuel Capacity	454 litres (120 US Gallons)
DIMENSIONS	
Length (over bumpers)	40.8 ft. (12.4 m)
Width	8.5 ft. (2.57 m)
Height	9.2 ft. (2.8 m)
Wheelbase	24.4 ft. (7 m)
Turning Radius	44 ft. (13.5 m)
Vehicle Weight	26,800 lbs. (12,156 kg.)
AXLES & SUSPENSION	
Front Axle	*Rockwell* FH-946
Front Load-Carrying Capacity	16,000 lbs. (7,258 kg.)
Rear Axle	*Rockwell* RC-26-633 (4.79:1)
Rear Load-Carrying Capacity	26,000 lbs. (11,794 kg.)
Suspension	Air Springs & Shock Absorbers
DESTINATION & ROUTE SIGNS	
Front Destination	*Luminator* Electronic
Side Destination	*Luminator* Electronic
Front Route	*Transign* Electronic
Rear Route	*Luminator* Electronic
LIGHTING	
Interior	*Transmatic* - Fluorescent, 24 Volt, Top Lit
HVAC SYSTEM	
HVAC Unit	*Thermo King* M42A - Rear Unit
Auxiliary Heaters	1 *Mobile Climate Control* Defroster Unit
	2 *Mobile Climate Control* Floor Heaters
	1 *Mobile Climate Control* Ramp Heater

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NEW FLYER

VEHICLE SPECIFICATIONS

SEATING	
Driver's	*Recaro* B100W
Passenger	*TS1* 1111
Seating Capacity	35
Wheelchair Stations	2 Tie-Downs (front side seats fold up & lock)
BRAKE SYSTEM	
Mechanical Components	Internal Expanded S-Cam Type
	Automatic Slack Adjusters
Service Brake	Full Air Operated
Parking Brake	Spring Applied, Air Released
Emergency Brake	Spring Brake Applied
	Brake Treadle Modulated to Control
WINDOWS	
General	Black Anodized Frame - Single Top Tip-In
	(bottom fixed)
	Glazing - Laminated Glass, 72% Green
Emergency Escape	Six Side Windows
Driver's Window	2 Piece Sliding - Interior & Exterior Handle
DOORS	
Entrance Doors	*Vapor* Slide Glide - 31.75" between Grabrails
Exit Doors	*Vapor* Slide Glide - 37.00" between Touchbars
	Touchbar Controlled Operation
Controls	5 Position Opening-Closing Control
	Door Manual Control Valve
SAFETY FEATURES	
Emergency Escape Exits	Six Side Windows
	Both Roof Hatches
Exit Door	Accelerator & Brake Interlocks
	Sensitive Edges

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15. VEHICLE TOWING

15.1. Description

Front towing is the recommended procedure for the low floor vehicle, using towing adapter kit shown. The method used will vary depending on the type of towing equipment at the disposal of the transit company. Rear towing is not a recommended procedure for the low floor vehicle due to insufficient ground clearance and the problem of locking the front wheels in a straight position. If the transit authority has its specific towing procedures, compare them carefully with the following.

⚠ CAUTION:

Care must be taken to ensure that the vehicle will not suffer structural damage as a result of towing.
When towing, the drive shaft or both rear axle shafts must be removed, regardless of distance or speed traveled to prevent damage and voiding of warranty to the power train components.

☞ NOTE:

An auxiliary air supply must be provided to the vehicle being towed to hold off the spring brakes and maintain suspension height. The auxiliary air supply should be a minimum of 100 psi. The auxiliary air connections are located in the center, in back of the front bumper.
The engine cannot be started by pushing or towing the vehicle.

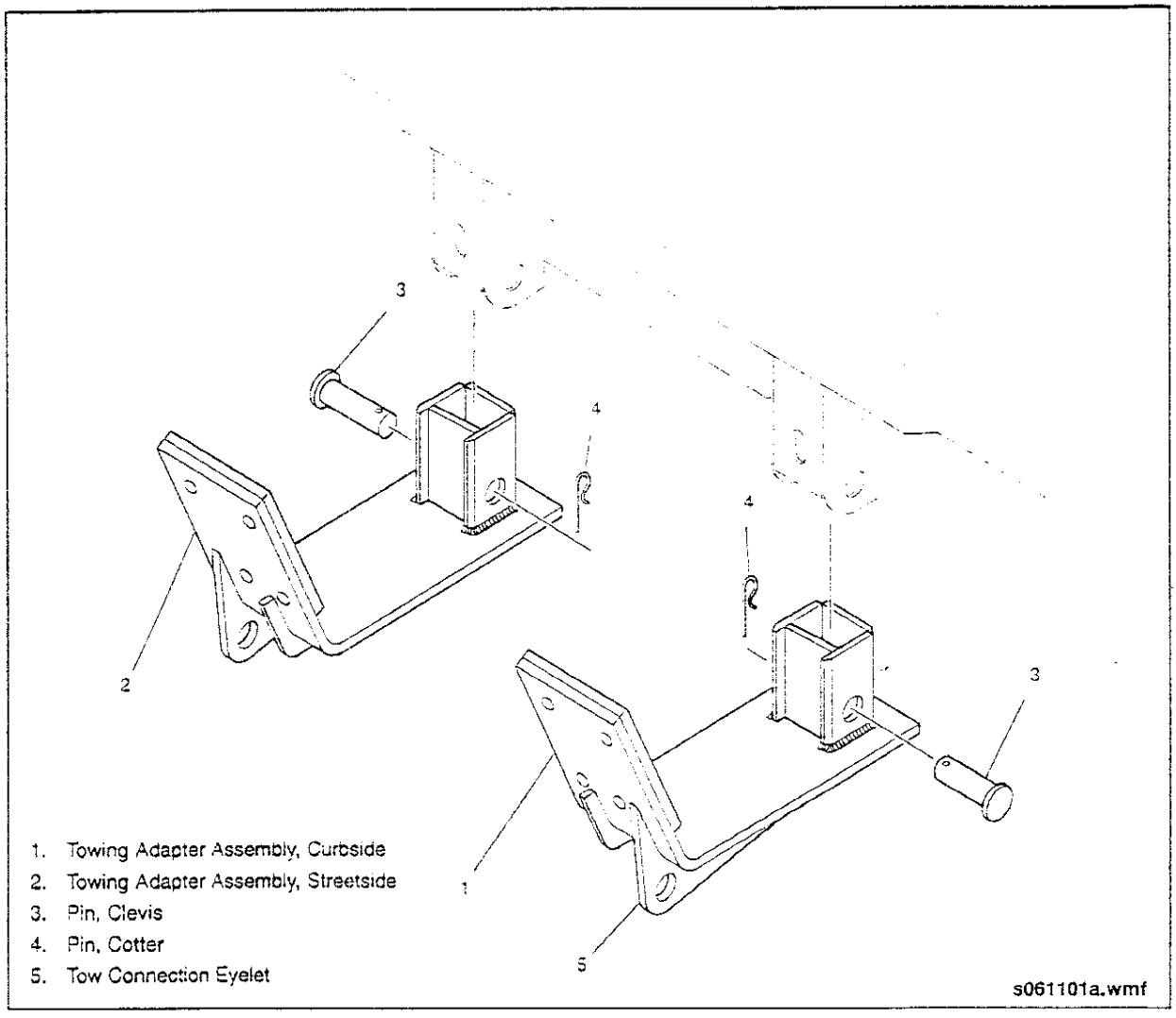

Fig. Gen-16: Towing Adapter

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15.2. Safety Precautions

1. Follow all State (provincial in Canada) and local traffic regulations regarding such items as warning signals, night illumination, speed etc.
2. A safety restraint system must be used that is independent of the primary lifting and towing attachments.
3. All loose or protruding parts of a damaged vehicle should be secured prior to towing.
4. Do not go under a vehicle which is being lifted by the towing equipment, unless the vehicle is adequately supported by safety stands or appropriate blocking.
5. No towing operation should be attempted for any reason which jeopardizes the safety of the operator, wrecker, bystanders or other motorists.
6. Do not exceed the recommended maximum speed of 35 mph (55 km/h) while towing.

15.3. Drive Shaft Removal

15.3.1. Safety Precautions

Ensure the vehicle is appropriately lifted and supported, and know the limitations of the lifting and blocking equipment. Always ensure that jarring and shaking created by component removal does not cause the vehicle to become unstable.

⚠ WARNING:

Do not attempt to lift or jack the vehicle on an incline, rough or uneven surface.

Do not use inadequate lifting or blocking methods. They can result in the vehicle falling off the lifting or blocking equipment, causing severe injury or death to service personnel.

Do not allow individuals to board the vehicle while supported solely by the lifting or blocking equipment.

Do not run engine or engage transmission while vehicle is resting on lifting or blocking equipment.

15.3.2. Lifting & Supporting Vehicle

1. Ensure vehicle is positioned on a stable, level surface.
2. Ensure front wheels are facing forward and chocked in position.
3. Raise vehicle to facilitate removal of drive shaft and place safety stands or appropriate blocks at designated locations to support vehicle at this height. Refer to Lifting and Jacking information in this section for jack stand locations.

⚠ WARNING:

Ensure each safety stand or block is precisely the same height and sitting completely level.

4. Lower vehicle slowly and carefully until it comes to rest on the safety stands or blocking.

15.3.2.1.Removal Procedure

☞ NOTE:

Tie up heavy drive shafts with a nylon support strap.

1. Remove drive shaft guard.
2. Disconnect drive shaft from transmission and differential yokes. Refer to Section 2 of this manual for more detailed information on drive shaft removal.

☞ NOTE:

To prevent bearing caps from sliding off universal joint, tape or wire them in place.

3. Remove drive shaft from under vehicle.
4. Raise vehicle to facilitate removal of safety stands or blocking.
5. Lower vehicle slowly and carefully.
6. Store drive shaft in an area on the vehicle that will prevent damage to the drive shaft and surrounding area of the vehicle in which it is stored.
7. Vehicle is now ready for towing.

15.4. Rear Axle Shaft Removal

☞ NOTE:

Refer to Section 2 of this publication for detailed information and illustrations for axle housing draining, filling, and axle shaft removal.

1. Push or pull disabled vehicle forward or back until planetary gear housing drain plug is positioned on bottom of axle housing.

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2. Attach oil drain chute to planetary gear housing.
3. Position a clean adequate capacity container to capture oil, under oil drain chute.
4. Remove both oil drain and filler plugs.

☞ **NOTE:**
Save used oil to refill planetary gear housing which has a capacity of 3.3 litres.

5. Remove eight bolts from planetary end cover.
6. Remove outer hex nut from center plug in planetary cover. Use a 12 mm adapter to turn in the plug to release the cover preload.
7. Mark planetary assembly and axle housing to align for re-assembly.
8. Pull out planetary assembly and axle shaft.
9. Pull axle shaft with sun gear out of axle housing.

☞ **NOTE:**
Label axle shaft, snap ring, shims, and thrust washers, left or right side. The parts are to be installed in the same axle side they were removed from because of the wear pattern.

10. Store axle shaft and parts in an area inside the vehicle that will prevent damage to the axle shaft and parts and surrounding area of the vehicle where they are stored.
11. Install planetary gear housing cover with drain plug opening positioned to the top of the axle housing and tighten planetary gear housing cover bolts.

☞ **NOTE:**
Positioning the drain plug opening at the top of the axle housing allows for air displacement for easier and faster refilling of gear oil.

12. Add saved oil using oil filler funnel.
13. Install and tighten planetary gear housing filler and drain plugs.
14. Repeat procedure for opposite axle shaft.
15. Vehicle is now ready for towing.

15.5. Vehicle Removal from Ditch

15.5.1. Chain Pulling Procedure

⚠ **CAUTION:**
Do not use a chain connected directly to the front or rear bumpers to pull the vehicle.

15.5.1.1. Pulling from the Front

1. Connect a chain hook onto one side of each tow adapter pin hole, in the front structural tow connectors, located behind the front bumper.
2. Protect the front bumper during pulling with a 4" x 4" or equivalent wood block placed between the chains and the bottom of the front bumper.
3. With the assistance of a driver to steer the vehicle, release the parking brake and pull the vehicle from the ditch.

15.5.1.2. Pulling from the Back

1. Connect a chain hook onto each tow pin located in each main rail behind the rear bumper.
2. Protect the rear bumper during pulling with a 4" x 4" or equivalent wood block placed between the chains and the bottom of the rear bumper.
3. With the assistance of a driver to steer the vehicle, release the parking brake and pull the vehicle from the ditch.

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Orion VII

ORION VII

Jacking, Hoisting, and Towing

Jacking and Hoisting

⚠ WARNING

Failure to correctly place floor jacks, safety stands, and hoisting equipment can result in personal injury and/or vehicle damage. Place floor jacks, safety stands, and hoisting equipment within the areas designated in the procedures.

Floor Hydraulic Hoist

If floor hydraulic hoists are being used to lift the vehicle, the front hoist must have a minimum capacity of 5 tons (4550 kg). The rear floor hoist must have a minimum capacity of 10 tons (9100 kg).

Floor Jack or Stand

Each floor jack or stand must have a minimum capacity of at least half of the floor hoist capacity required for that end of the vehicle.

Refer to Figure 8 for jacking and hoisting points.

Precautions

Always observe the following precautions:

1. Position the vehicle on a hard, level, flat surface when preparing to lift it.
2. Never go beneath a vehicle that is supported only by floor jacks.

3. Never leave the vehicle suspended solely by floor jacks, always use both floor jacks and safety stands (see Figure 5 and Figure 6).

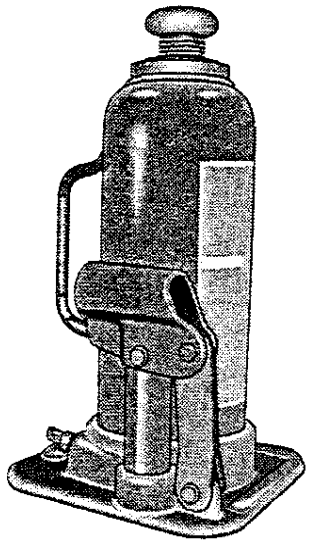


Figure 5 Hydraulic Floor Jack

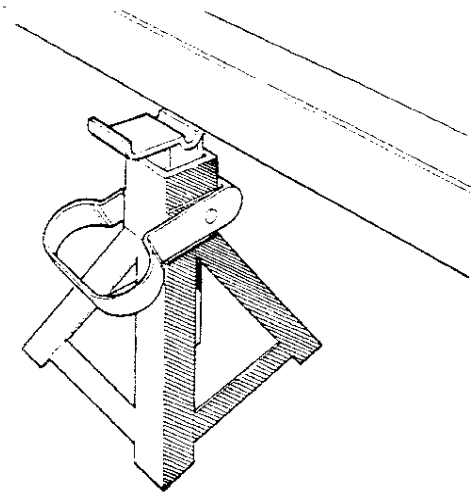


Figure 6 Floor Jack Safety Stand

4. When only one side (or end) of the vehicle is to be raised (e.g., changing a tire), chock the front and rear wheels on the side opposite the wheel being raised.
5. Place the shift selector in Neutral and release the parking brakes prior to jacking the vehicle.
6. Do not start, or run an engine when the vehicle is being supported by floor jacks alone. Floor jacks are used for lifting only. Support the vehicle with safety stands once lifted.

7. To remove a flat tire, raise the vehicle just enough so an inflated spare tire will clear the floor/ground when installed.
8. Always wear eye protection when working under the vehicle.
9. Locate floor jacks and safety stands as detailed in this section of the manual. All support equipment must meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - 8 inch diameter lifting pad
   - 4 3/4 inch spacing between the pad ears

Vehicle Pick Up and Support

The Orion VII is a "low floor" vehicle with a lattice-type chassis containing no continuous longitudinal main support beams. There are several locations along the chassis (mainly on transverse structure) which are the recommended pick up and support points, in addition to the normal axle hoist points. These sites, along with the location of the front and rear are shown in Figure 7 and Figure 8.

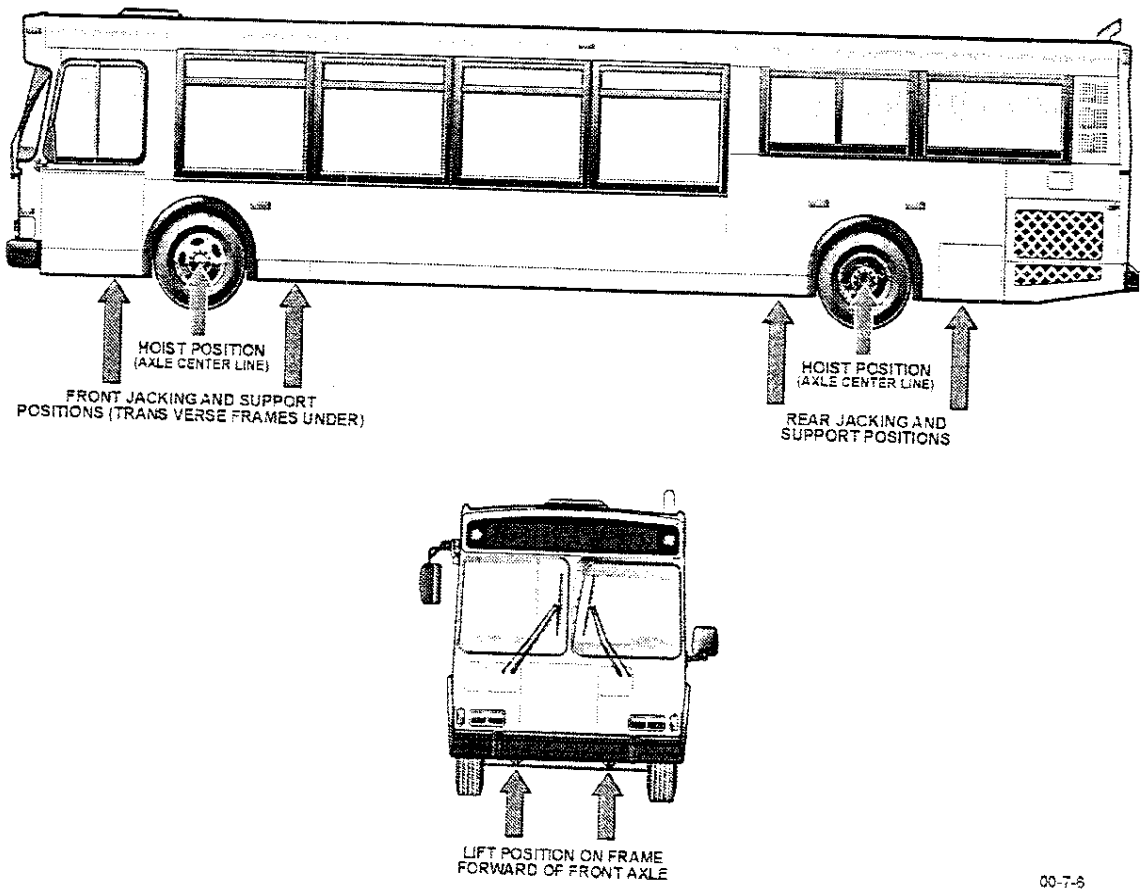


Figure 7 Pick Up and Support Locations - Profile

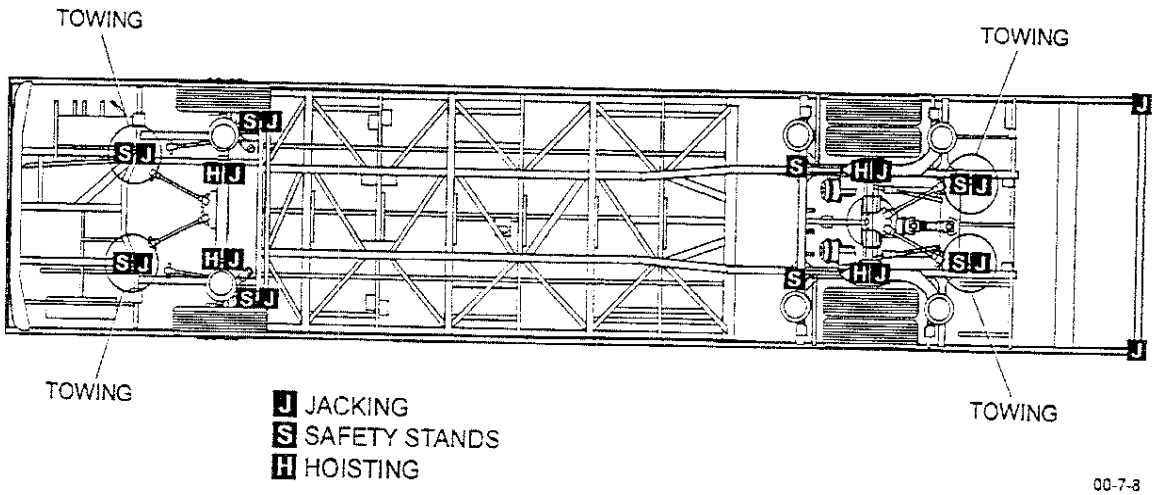


Figure 8 Jacking and Hoisting Points

Raising and Supporting the Vehicle Front or Rear

Lifting the front or rear of the vehicle can be accomplished using devices such as jacks, tow truck lifting arms, etc. Although the following procedure mainly describes lifting with floor jacks, the basic vehicle and personal safety precautions would apply to all lifting devices and methods.

1. Use blocks/chocks at the front or rear wheels, as applicable, to prevent vehicle movement.
2. Ensure that the shift selector is in the Neutral position, and then release the parking brakes.

NOTE

If vehicle air pressure is low or unavailable, connect a filtered auxiliary/shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension system.

---

3. For front lift, use two floor jacks. position the concave head of each jack with the lift pad (see Figure 9).
4. To rear lift, use two floor jacks, position the concave head of each jack with the lift pad.

CAUTION !

The tow eyes are designed for pulling the vehicle only. Attempting to tow the vehicle using the tow eyes only will cause structural damage. Do not lift the vehicle from the tow eyes.

5. Raise each floor jack until the center of the lifting pad contacts the frame, and position securely.
6. Raise each floor jack alternately so that the vehicle is basically level as it is raised.
7. Raise the vehicle to the required height, and adjust the safety stands under the frame section.
8. To lower the vehicle:
   a. Raise the vehicle slightly, using the floor jacks, and then remove the safety stands.
   b. Slowly relieve the pressure from the floor jacks to lower the vehicle evenly to the ground.

Changing a Flat Tire

WARNING

Place jacks and safety stands within the areas designated in the following procedures. Failure to do so could result in personal injury and/or vehicle damage.

NOTE

If the jack does not fit under the air bag plate, jack the frame at the bumper until the appropriate height is achieved.

Observe the following precautions:

1. Use chocks and blocks to prevent vehicle movement.
2. Ensure that the shift selector is in the Neutral position. Release the parking brakes prior to raising the vehicle with floor jacks.
3. Make sure that the floor jacks meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - 8 inch diameter lifting pad
   - 4 3/4 inch spacing between the pad ears

4. If bottle jacks are used, make sure that they meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - Maximum height 10 inches

NOTE

If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension.

Front Roadside Flat

1. Ensure that the vehicle suspension is fully raised, and that the kneeling system is not engaged.
2. Maneuver the floor jack into position from the roadside of the vehicle.
3. Position the jack lifting pad directly below the transverse frame either in front or behind the flat tire.
4. Raise the jack until the center of the lifting pad contacts the frame. Make sure the jack is securely positioned beneath the jacking point.
5. Loosen the wheel nuts but **Do Not Remove the Nuts.**
6. Raise the vehicle so that the tire just clears the ground.
7. Place the safety stands in the positions shown in Figure 9.
8. Lower the vehicle onto the safety stands and remove the wheel.

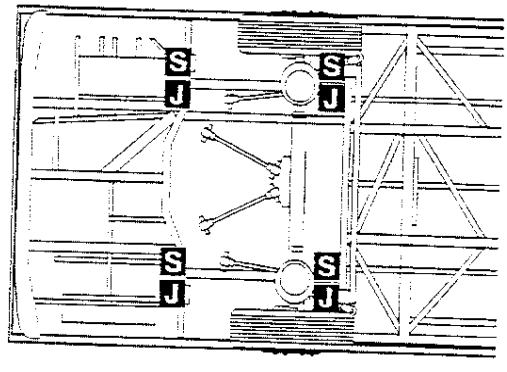


Figure 9 Front Roadside Flat

Front Curbside Flat

1. Ensure that the vehicle suspension is fully raised, and that the kneeling system is not engaged.
2. Maneuver the floor jack into position from the curbside of the vehicle.

3. Position the jacking lifting pad directly below the transverse frame either in front of or behind the flat tire.
4. Raise the jack until the center of the lifting pad contacts the frame. Make sure the jack is securely positioned beneath the jacking point.
5. Loosen but Do Not Remove the Wheel Nuts.
6. Raise the vehicle so that the tire just clears the ground.
7. Place the safety stands in the positions shown in Figure 9.
8. Lower the vehicle onto the safety stands and remove the wheel.

Rear Roadside and Curbside Flats

Follow the basic procedures and safety precautions listed for front flats when fixing flats at rear of the vehicle. Note that the transverse frames around the axle at the rear of the vehicle are different in breadth than those at the front of the vehicle. This difference dictates changes in the placement of jacks and safety stands (see Figure 12).

Jacking Rear Tire Flat

1. Place shift selector in Neutral position.
2. Apply Park Brake.
3. Place heavy duty jack under air bag plate of suspension beam. Refer to Figure 12 item J1.
4. Loosen but Do Not Remove the Wheel Nuts.
5. Jack up axle to an appropriate height for tire removal/replacement.

Jacking Rear Dual Tire Flats

1. Place shift selector in Neutral position.
2. Apply Park Brake.
3. Place wedge block under front tire.
4. Place a heavy duty jack under the air bag plate of suspension beam. Refer to Figure 12 item J1.

NOTE

If the jack does not fit under the air bag plate, jack the corners of the frame until appropriate height is achieved. Refer to Figure 10, Figure 11 and Figure 12 item J2.

---

5. If correct height is not achieved when jacking, place safety stands next to jack, and lower bus on stand.
6. Place a block(s) under the jack and raise the vehicle until desired height is achieved.

7. Remove and replace tires.

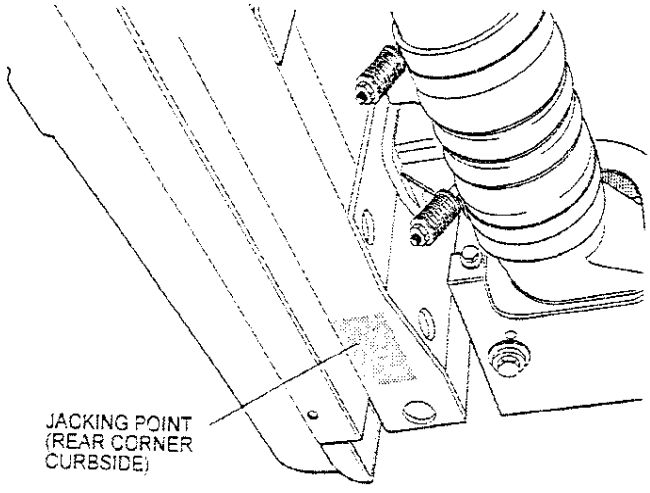


Figure 10 Rear Curbside Jacking Point

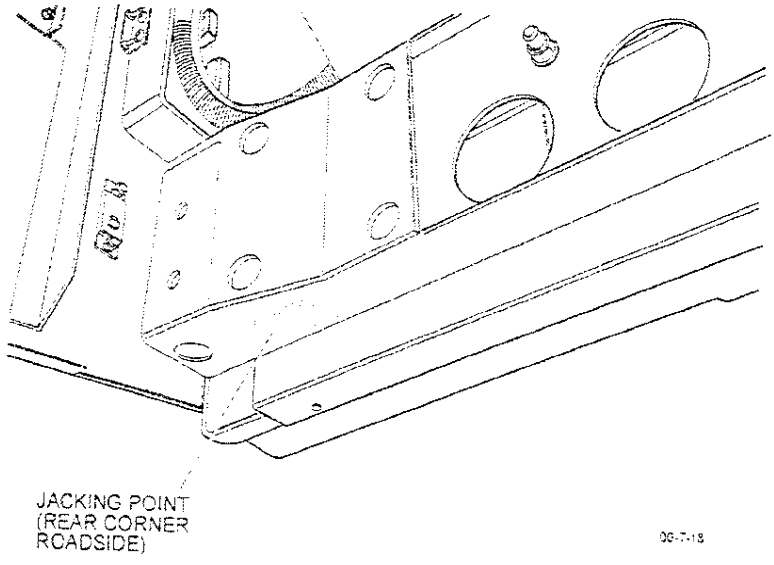
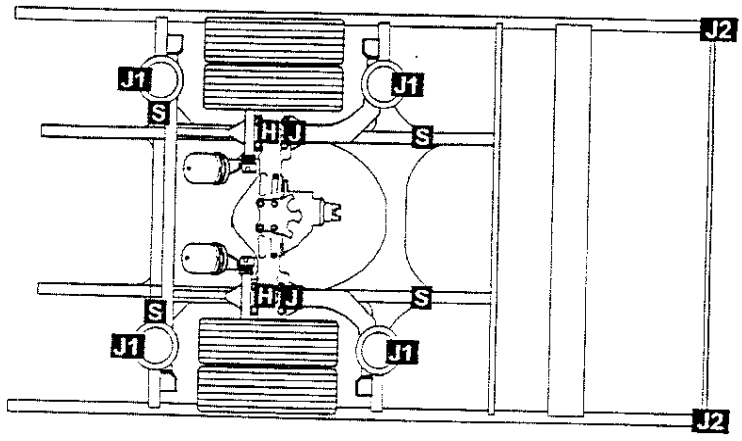


Figure 11 Rear Roadside Jacking Point



H HOISTING
S SAFETY STANDS
J JACKING

Figure 12 Rear Flat Jacking Positions

Required Materials

1. Replacement tire or tires
2. 2 heavy duty hydraulic bottle type jacks
3. 1 wedge block
4. 1 creeper
5. Lug wrench and bar
6. 1 adjustable safety stand
7. 1 torque wrench
8. 2 - 8" x 8" x12" blocks

Vehicle Hoisting/Axle Lift

⚠ WARNING

Ensure all personnel stand clear of the vehicle before hoisting. The engine must be turned off while the vehicle is being lifted by a hoist.

CAUTION !

Do not hoist the vehicle by it's suspension and leave it hoisted overnight. The suspension system air could leak causing the vehicle to sag and become dangerously unbalanced. If the vehicle must be left on a hoist for an extended period of time, place safety stands at both front and rear, roadside and curbside locations see Figure 13).

1. Place the vehicle over the hoist and position the hoist adapter pads such that they contact the points as far outboard as possible.
2. Raise the hoist posts so that contact is made. Do not lift the vehicle.
3. Release the parking brake.

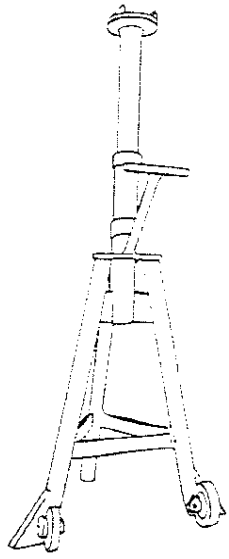


Figure 13 Hoist Safety Stand

CAUTION !

If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain the air pressure in the suspension system.

4. Always inspect the hoist area, and make sure that nothing will interfere with, or cause damage to, the vehicle.
5. Ensure that the hoist pads are still properly locatedat the jacking points, and then raise the vehicle.
6. Lift the front and rear of vehicle at the same rate, maintaining correct level at all times.

CAUTION !

Ensure that the safety stands firmly contact the vehicle frames and do not interfere with the operation of the suspension. Do not lower the hoists after the vehicle is supported by the safety stands. The hoists are required to support the vehicle's suspension system.

7. Engage hoist safety locks and position four safety stands under the vehicle, two at the front and two at the rear.

CAUTION !

When lowering the vehicle, slow the descent when the wheels initially touch the ground to allow time for the air bags to inflate. Pinching of under-inflated air bags can cause damage to the suspension system.

Vehicle Towing

Tow eyes are located on the front end and the rear end of the vehicle.

Front Tow Eyes

Only front tow eyes are to be used for towing the vehicle, with all wheels on the ground. If the front end of the vehicle must be lifted, the tow bar must be placed under the front jacking pads shown in Figure 8.

Rear Tow Eyes

Front tow eyes are only to be used to tow the vehicle. Rear tow eyes are to be used only to position the vehicle (such as pulling the vehicle straight out of a ditch). If rear end lifting of the vehicle is required for towing, the tow adapters must be placed under the rear safety stand pads as shown in Figure 8.

CAUTION !

Exercise the following towing precautions to ensure that the vehicle will not suffer any structural damage. If the transit authority has its own towing procedures, compare them carefully with the procedures recommended below.

NOTE

You cannot start the engine by pushing or towing the vehicle.

General Precautions

1. Make sure that towing vehicle complies with all state, provincial, and local laws. These laws govern the required use of warning signals, night illumination, and speed limits.
2. A safety chain system is completely independent of primary towing attachments, must be used.
3. Never tow a vehicle over 35 m.p.h. (55 km/hr.).
4. Refrain from going under a vehicle that has to be lifted, unless the vehicle is properly blocked and supported.
5. Do not attempt any towing operation which might jeopardize the safety of the operator, bystanders, or other motorists.
6. Secure all loose or protruding parts of damaged vehicles prior to towing.
7. If the rear wheels are to be left on the ground during the tow (front towing only), make sure to:
   a. Place the shift selector in the Neutral position;
   b. As a primary and recommended option, mechanically disconnect the driveshaft; or
   c. As a secondary option, remove the rear axle stub shafts, and cover the shaft openings to prevent loss of lubricant and ingress of foreign material.
8. Provide a minimum auxiliary air supply of 70 psi (normally from the towing vehicle) to the vehicle being towed. This allows adequate air to hold off the spring brakes and maintain the suspension height.

Front Towing

Towing Bus from Front Frame with 3 Stage Tow Truck Stinger

In order to tow the bus, a "double pick up" procedure will have to be performed. This procedure consists of lifting the vehicle at the front pick-up jack pads with bottle jack (10T), floor jack, or with the tow truck stinger from under the front frame. The vehicle is to be lifted up to the point that a wooden block (4" x 4") could be placed under each tire. Once the wooden blocks are in place, the forks should be installed at the stinger, then the bus is to be lifted for the second time using the stinger.

Flat Tow

CAUTION !

The two tow eyes are provided for use with a tow bar only. Lifting the vehicle by the tow eyes may result in structural damage, do not lift the vehicle by the tow eyes.

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1. Locate the tow eyes on the main frame braces just beneath the front bumper (see Figure 14).

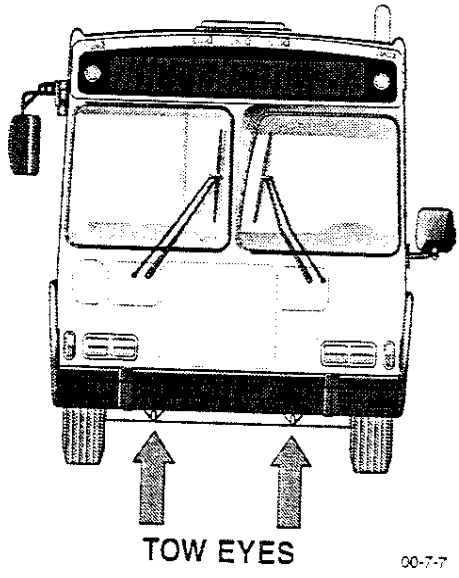


Figure 14 Front Tow Eyes

2. Locate the front shop air filler valve behind the windshield washer fill door (see Figure 15).

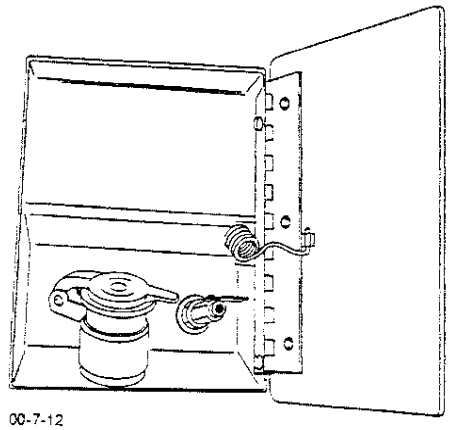


Figure 15 Front Shop Air Valve

3. Connect the towing vehicle's auxiliary air supply to the air filler valve of vehicle to be towed.
4. Attach the tow bar (see Figure 16) to the front tow eyes and secure it to the towing vehicle. Ensure that the necessary safety precautions are observed, connecting devices are engaged and a secondary fastening system (i.e., safety chain) is secure.

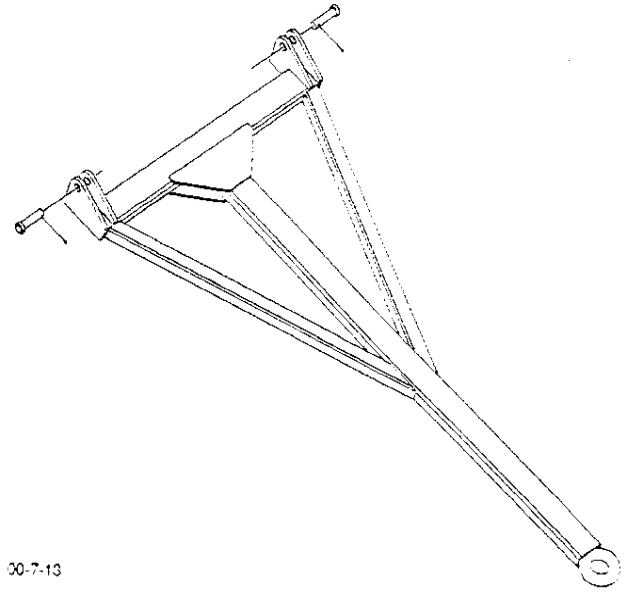


Figure 16 Tow Bar Assembly

5. Ensure that the shift selector is in the Neutral position and the rear axle stub shafts are removed.

Lift Tow

CAUTION !

Never lift tow the vehicle by the front bumper frame.

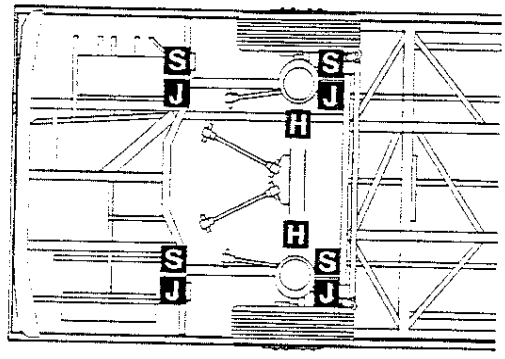
NOTE

If vehicle has a flat tire or air suspension is down follow the three stage tow truck singer procedure. See "Towing Bus from Front Frame with 3 Stage Tow Truck Stinger" on page 23

1. Extend the tow truck lifting arms so that the claws grasp the vehicle frame at the jacking/safety stand positions just forward of the front wheels (see Figure 17).

NOTE

A 7' stinger boom extension rated for 20,000 lbs is the minimum requirement when towing from the front with 2" forks.



S SAFETY STANDS
J JACKING
H HOISTING

00-7-11

Figure 17 Front Lift Tow Grasp Points

2. Ensure that the necessary safety precautions are observed, connecting devices are engaged and a secondary fastening system (i.e., safety chain) is secure.
3. Connect the tow truck's auxiliary air supply to the front air filler valve of vehicle to be towed.

4. Ensure that the shift selector is in the Neutral position, the rear axle stub shafts are removed.
5. Lift the front of the vehicle until the front wheels leave the ground and commence the tow.

Rear Towing

Towing Bus from Rear Frame with 3 Sage Tow Truck Stinger

NOTE

If vehicle has a flat tire or air suspension is down follow the three stage tow truck singer procedure.

In order to tow the bus, a "double pick up" procedure will have to be performed. This procedure consists of lifting the vehicle at the rear pick-up jack pads with bottle jack (10T), floor jack, or with the tow truck stinger from under the rear frame. The vehicle is to be lifted up to the point that a wooden block (4" x 4") could be placed under each tire. Once the wooden blocks are in place, the forks should be installed at the stinger, then the bus is to be lifted for the second time using the stinger.

CAUTION !

Do not flat tow the vehicle from the rear as it will be too difficult to maneuver.

NOTE

A 9' stinger boom extension rated for 20,000 lbs is the minimum requirement when towing from the rear with 4" forks.

Using Towing Arms

1. Ensure the tow arm adapters properly engage the towing/jack pads. See Figure 18.

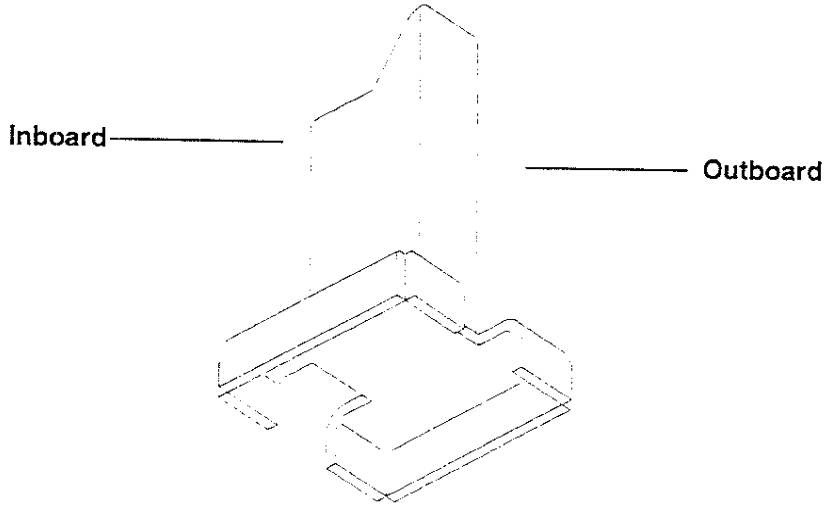


Figure 18 Typical Jack Pad

NOTE

Lifting and towing pads are located on the rear transverse frame, offset towards the roadside of the vehicle.

2. Ensure that all safety devices (safety chains, etc.) are in place.
3. Connect the towing vehicle's auxiliary air supply line to the rear shop air filler valve (Figure 19).

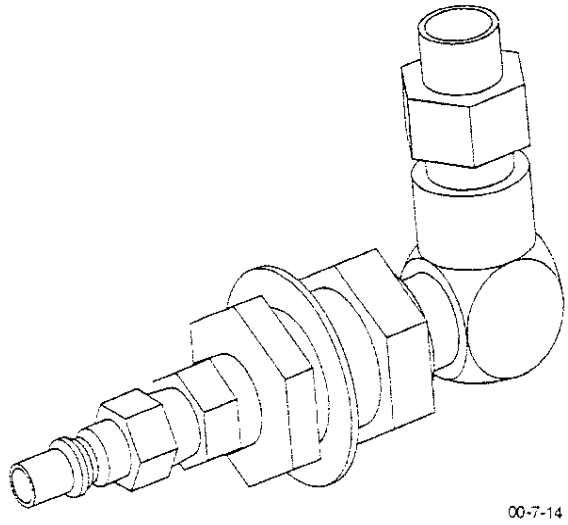


Figure 19 Rear Shop Air Valve

4. Secure the steering wheel with a steering wheel lever belt to minimize the movement of the front of the vehicle.
5. Lift the vehicle until the rear wheels leave the ground and commence the tow.

NOTE

The rear filler valve is located in the air dryer compartment on the roadside of the vehicle, in front of the rear wheels.

Using Towing Chain

1. Position a section of protective lumber under the bumper and wrap the towing chain around the chassis frame (on both sides) at least once.
2. Make sure that all safety devices (safety chains. etc.) are in place.
3. Connect the towing vehicle's auxiliary air supply line to the rear shop air filler valve in the engine compartment.
4. Secure the steering wheel with a steering wheel lever belt to minimize the movement of the front of the vehicle.
5. Release the parking brake and commence the tow.

4. Insert a 1/2 in. diameter chain with a hook on each end either through each tow eye, or around each trailing arm.

5. Connect each hook to the first chain link that protrudes from the front of tow eye or trailing arm.

6. Place a hardwood block (approximately 6 in. by 6 in. by 4 ft. long) between the chains and the underside of the bumper. Also place a length of rubber mat or tire tread between the front face of bumper and tow rig. This will prevent cutting and scuffing of the bumper when vehicle is lifted and towed.

7. Attach the chains to the tow vehicle according to the transit authority's standard procedures. An additional safety chain must also be attached between the vehicles.

8. Ensure transmission selector is in the Neutral position (N).

9. Release the vehicle parking brakes and remove chocks from rear wheels.

10. Raise vehicle high enough for front tires to clear the roadway (six to eight inches).

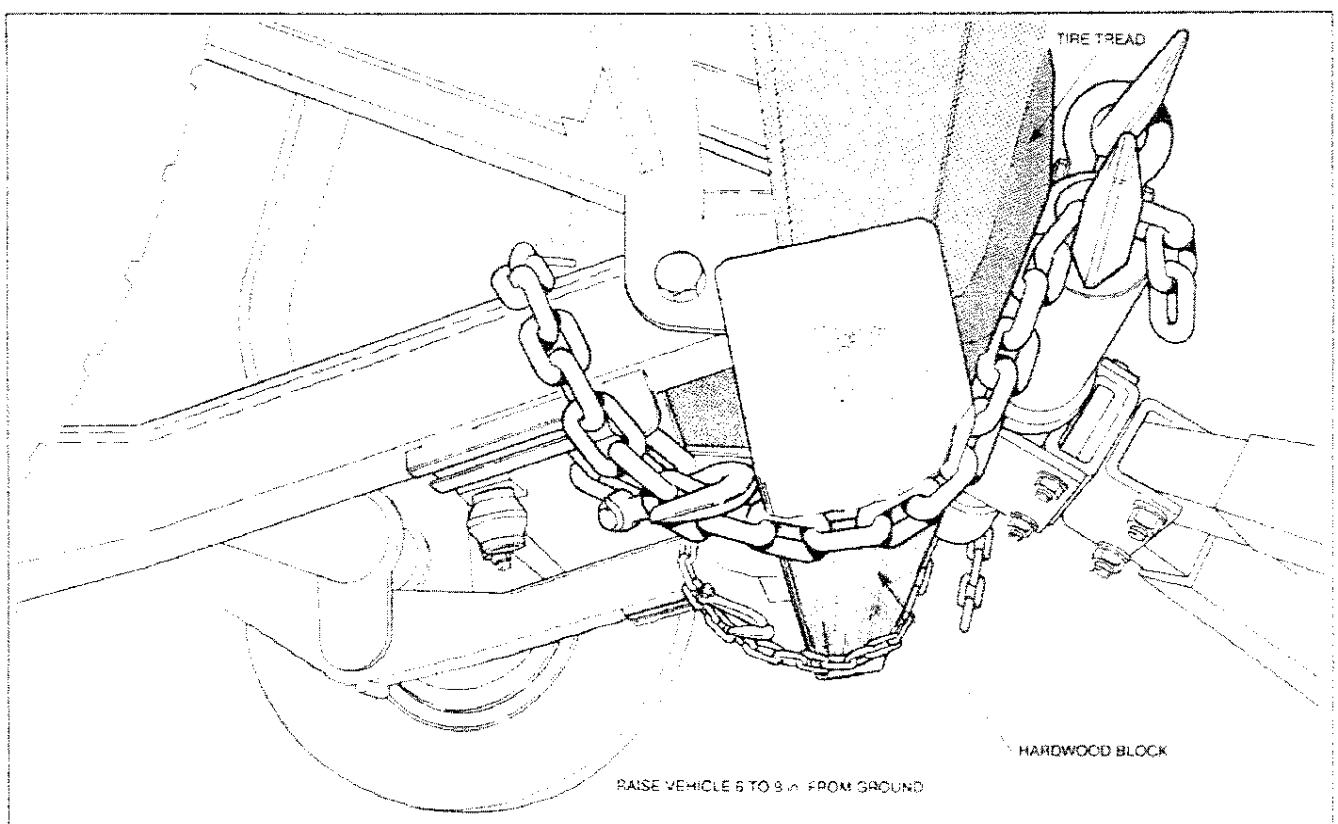
CAUTION: Do not raise bus higher than necessary.

Lift Towing Vehicle From The Rear

NOTE: Prior to Serial No. 5087 tow eyes located below the rear bumper were only provided for emergency use, such as winching the bus out of a ditch. They are not to be used to lift and tow vehicle.

Buses built after Serial No. 5086 are equipped with tow eyes that can be used to lift and tow vehicle, although, the driveshaft between transfer case and transmission must be removed, and the steering wheel locked or tied to prevent excessive movement. All other safety precautions must be practiced, as in lifting and towing vehicle from the front.

NOTE: If the auxiliary air connection will not release the rear axle spring brakes (Parking Brakes) the chambers may have to be manually caged by the tow truck operator.



TYPICAL CHAIN CONNECTION FOR TOWING VEHICLE FROM THE FRONT

FIG. 00-14

TOWING

CAUTION: The following are the recommended procedures for towing the vehicle. Caution must be exercised to ensure that the bus will not suffer structural damage as a result of towing. If the transit authority has its own towing procedures, compare them carefully with those recommended in this manual.

NOTE: The engine cannot be started by pushing or towing the vehicle.

General Precautions

1. All state (Provincial in Canada) and local laws regarding such items as warning signals, night illumination, speed, etc. must be followed.

2. A safety chain system must be used that is completely independent of the primary lifting and towing attachments.

3. No vehicle should ever be towed over 35 mph.

4. Loose or protruding parts of damaged vehicle should be secured prior to moving.

5. Refrain from going under the vehicle which is being lifted by the towing equipment, unless the vehicle is adequately supported by safety stands.

6. No towing operation which for any reason jeopardizes the safety of the wrecker, operator, bystanders, or other motorists, should be attempted.

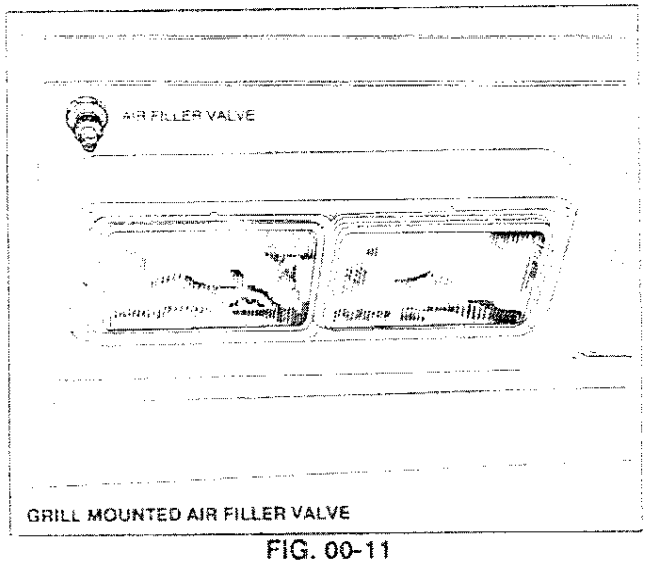
WARNING: An auxiliary air supply must be provided to the vehicle while being towed, so that adequate air is available to hold off the spring brakes and ensure that suspension height is maintained. This supply should be a minimum of 100 psi.

Lift Towing Vehicle From The Front

1. On some vehicles prior to Serial No. 5036 removeable tow eyes were used. These are stored on the driver's front side inner wheelwell. In order to tow vehicle, remove end caps and slide tow eyes into frame channels, located between radiator grill. Secure eyes with clevis pins. On all other vehicles the tow eyes are located on the front axle trailing arms.

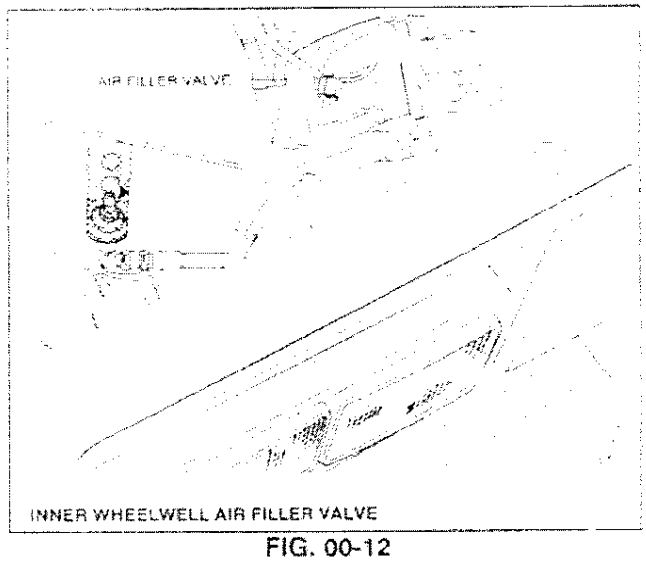
2. Apply the parking brakes and place a chock behind each rear wheel.

3. Connect an auxiliary air supply to vehicle air system filler valve. This is located either on the driver's side grill area, the inner drivers side wheelwell or the quick disconnect air line at the air dryer. Adapters may be required.



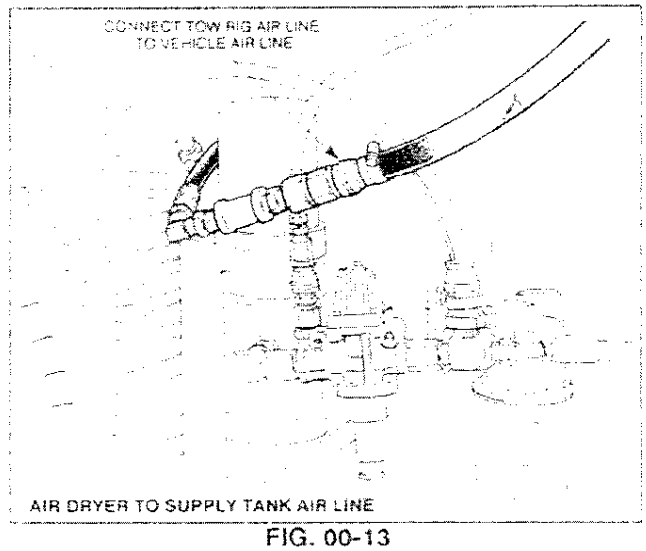
GRILL MOUNTED AIR FILLER VALVE

FIG. 00-11



INNER WHEELWELL AIR FILLER VALVE

FIG. 00-12



AIR DRYER TO SUPPLY TANK AIR LINE

FIG. 00-13

Orion VII

NG Hybrid

Body and Axle Data

Table 1 lists the body dimensions, axle model numbers, and capacities.

Table 1 Body and Axle Data (Model 07.501)

ITEM	DIMENSION ((US/METRIC)
Vehicle Length (Over Body)	40.39 ft / 12.31 m
Vehicle Length (Over Bumpers)	41.19 ft / 12.55 m
Vehicle Width (Over Body)	101.87 in / 258.75 cm
Vehicle Width (Including Mirrors)	123.44 in / 313.54 cm
Vehicle Height (Battery Tub Closed)	132 in / 335.28 cm
Vehicle Height (Battery Tub Open)	167.2 in / 424.69 cm
Wheelbase	286 in / 726.44 cm
Maximum Turning Radius	42.69 ft / 13.01 m
Front Axle (Meritor FH-946 Std.)	16,500 lb / 7500 kg Capacity
Rear Axle (Meritor 71163 Std.)	28,600 lb / 13,000 kg Capacity (Ratio: 6.14)
Wheel Size	Firestone Accuride 22.5 in X 8.25 in (Steel)
Tire Size	R21 Firestone CTRAZ B305/70R22.5 (Rating H)

Table 2 Propulsion System

COMPONENT	MODEL NUMBER/TYPE
Engine	Cummins ISB 2007 Hybrid 260 HP
HybriDrive® AC Traction Motor	B.A.E.

Fluid and Fuel Capacities

NOTE

The information contained in the following fluid capacity table are estimated capacities.

Table 3 Fluid Capacities (Sheet 1 of 2)

SYSTEM/COMPONENT	MODEL	CAPACITY
Engine Oil (Including Filters)	Mobil Delvac 1300S SAE 15W40	4 US Gallons / 15.14 Liters
Traction Motor (System)	Castrol Transynd	6 US Gallons / 22.7 Liters
Fuel Tank	#1 ULSD	100 US Gallons / 379 Liters
Cooling (Engine Only)	Ethylene Glycol	2.3 US Gallons / 9 Liters
Cooling (System)	Ethylene Glycol	29 US Gallons/109 Liters
Hydraulic System	Castrol Transynd	14 US Gallons / 52.9 Liters

Table 3 Fluid Capacities (Sheet 2 of 2)

SYSTEM/COMPONENT	MODEL	CAPACITY
Front / Rear Axle Bearings	NL G1 Grade (Grease)	4 oz / .11 kg
Rear Axle Differential Fluid	Oil SAE 80W90	5.1 US Gallons / 19.4 Liters
Power Steering Fluid	N/A	1 US Gallon / 3.8 Liters
Windshield Washer Fluid		6 US Gallons / 22.7 Liters
Wheelchair Ramp	Dexron VI	1 Pint/.5 Liter

Maintenance Precautions

Information contained in this manual is intended to supplement, rather than replace, standard shop practices and safety procedures.

Make safety the number one priority during any maintenance task.

To reduce the risk of personal injury and/or vehicle damage during maintenance, adhere to the following precautions:

- Observe and follow all Dangers, Warnings, and Cautions.
- If a part requires replacement, replace with the same part, or a part of higher quality.

Metric Fasteners

Follow these guidelines when fastener replacement is required:

WARNING

Using incorrect fasteners can result in personal injury and/or vehicle damage or malfunction. Use only compatible replacement fasteners.

- Make sure replacement fasteners, whether metric or imperial, have the same measurements and strength as those being replaced.
- If in doubt about the compatibility of replacement fasteners, contact Daimler Buses.

Jacking, Hoisting, and Towing

Jacking and Hoisting

⚠ WARNING

Failure to correctly place floor jacks, safety stands, and hoisting equipment can result in personal injury and/or vehicle damage. Place floor jacks, safety stands, and hoisting equipment within the areas designated in the procedures.

When floor jacks, hydraulic hoists, or stands are being used to lift the vehicle, all support equipment must meet or exceed the minimum lift capacity rating of 10 tons (9100 kg).

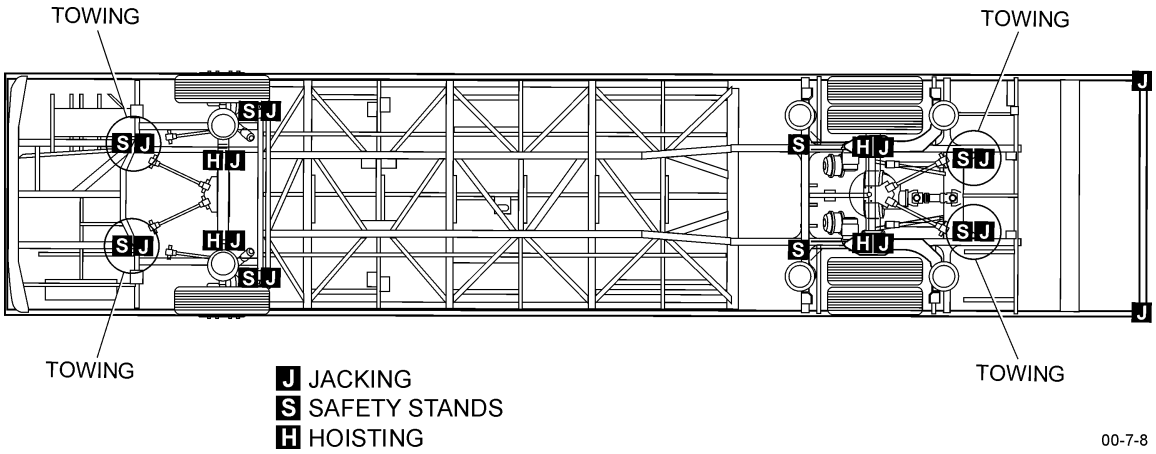


Figure 4 Jacking and Hoisting Points

Refer to **Figure 4** for jacking and hoisting points.

Precautions

Always observe the following precautions:

1. Position the vehicle on a hard, level, flat surface when preparing to lift it.
2. Never go beneath a vehicle that is supported only by floor jacks.

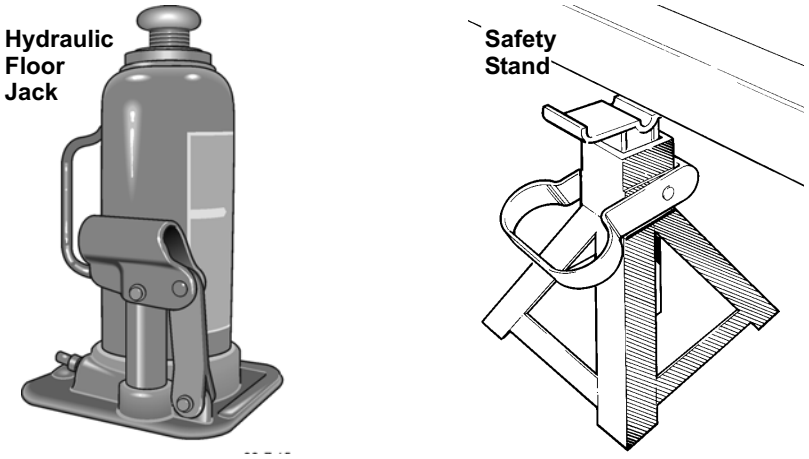


Figure 5 Hydraulic Floor Jack and Safety Stand

3. Never leave the vehicle suspended solely by floor jacks, always use both floor jacks and safety stands **(see Figure 5)**.
4. When only one side (or end) of the vehicle is to be raised (e.g., changing a tire), chock the front and rear wheels on the side opposite the wheel being raised.
5. Place the shift selector in Neutral and release the parking brakes prior to jacking the vehicle.
6. Do not start, or run an engine when the vehicle is being supported by floor jacks alone. Floor jacks are used for lifting only. Support the vehicle with safety stands once lifted.
7. To remove a flat tire, raise the vehicle just enough so an inflated spare tire will clear the floor/ground when installed.
8. Always wear eye protection when working under the vehicle.
9. Locate floor jacks and safety stands as detailed in this section of the manual. All support equipment must meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - 8 inch diameter lifting pad
   - 4 3/4 inch spacing between the pad ears

Vehicle Pick Up and Support

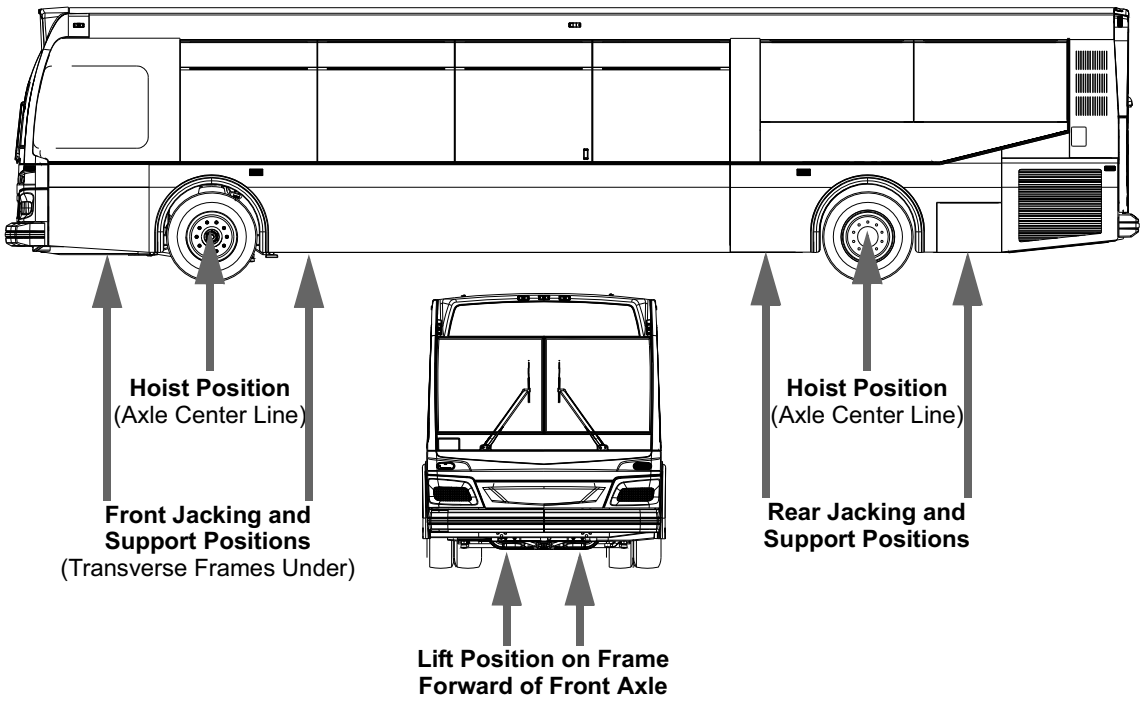


Figure 6 Pick Up and Support Locations

The Orion VII N.G. bus is a "low floor" vehicle with a lattice-type chassis containing no continuous longitudinal main support beams. There are several locations along the chassis (mainly on the transverse structure) which are the recommended pick up and support points, in addition to the normal axle hoist points. These sites, along with the location of the front and rear, are shown in **Figure 4** and **Figure 6**.

Raising and Supporting the Vehicle Front or Rear

Lifting the front or rear of the vehicle can be accomplished using devices such as jacks, tow truck lifting arms, etc. Although the following procedure mainly describes lifting with floor jacks, the basic vehicle and personal safety precautions would apply to all lifting devices and methods.

1. Use blocks/chocks at the front or rear wheels, as applicable, to prevent vehicle movement.
2. Ensure that the shift selector is in the Neutral position, and then release the parking brakes.

NOTE

If vehicle air pressure is low or unavailable, connect a filtered auxiliary/shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension system.

3. To raise the vehicle, use two floor jacks and position the concave head of each jack with the lift pad **(see Figure 4)**.

CAUTION !

The tow eyes are designed for pulling the vehicle only. Attempting to tow the vehicle using the tow eyes only will cause structural damage. Do not lift the vehicle from the tow eyes.

4. Raise each floor jack until the center of the lifting pad contacts the frame, and position securely.
5. Raise each floor jack alternately so that the vehicle is basically level as it is raised.
6. Raise the vehicle to the required height, and adjust the safety stands under the frame section.
7. To lower the vehicle:
   a. Raise the vehicle slightly, using the floor jacks, and then remove the safety stands.
   b. Slowly relieve the pressure from the floor jacks to lower the vehicle evenly to the ground.

Changing a Flat Tire

Safety Precautions

CAUTION !

Place jacks and safety stands within the areas designated in the following procedures. Failure to do so could result in personal injury and/or vehicle damage.

NOTE

If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension.

1. Use chocks and blocks to prevent vehicle movement.
2. Ensure that the shift selector is in the Neutral position. Release the parking brakes prior to raising the vehicle with floor jacks.
3. Ensure that the floor jacks meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - 8 inch diameter lifting pad
   - 4 3/4 inch spacing between the pad ears
4. If bottle jacks are used, make sure that they meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - Maximum height 10 inches.

Required Materials

Replacement tire or tires	Lug wrench and bar
2 heavy duty hydraulic bottle type jacks	1 adjustable safety stand
1 wedge block	1 torque wrench
1 creeper	2 8" x 8" x12" blocks

NOTE

If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension.

Front Flat Tire

1. Ensure that the vehicle suspension is fully raised, and that the kneeling system is not engaged.

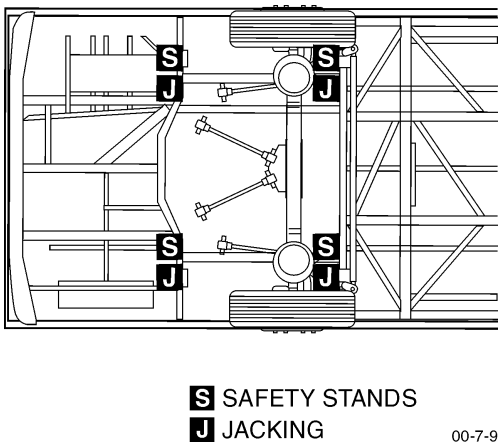
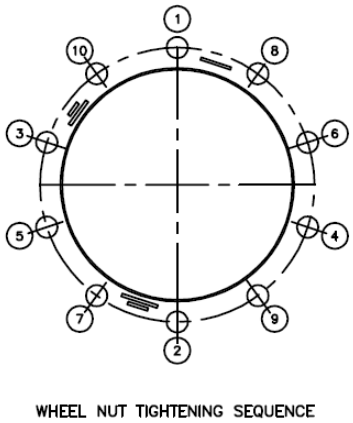


Figure 7 Front Jack Positioning

2. Maneuver the floor jack into position from the roadside of the vehicle. See **Figure 7.**
3. Position the jack lifting pad directly below the transverse frame either in front or behind the flat tire.
4. Raise the jack until the center of the lifting pad contacts the frame. Make sure the jack is securely positioned beneath the jacking point.
5. Loosen the wheel nuts but **Do Not Remove the Nuts**.
6. Raise the vehicle so that the tire just clears the ground.
7. Place the safety stands in the positions shown in **Figure 7**
8. Lower the vehicle onto the safety stands and remove the wheel.
9. Reverse the above procedure to complete the task.



Torque:
500 FtLbs (677Nm)

Figure 8 Wheel Tightening Sequence

10. Torque lug nuts to 500 FtLbs (677 Nm). See **Figure 8.**

Rear Flat Tire

1. For safety precautions for flat tire service, see **“Changing a Flat Tire” on page 13.**
2. Place shift selector in Neutral position.
3. Apply Park Brake.
4. Place wedge block under front tire.

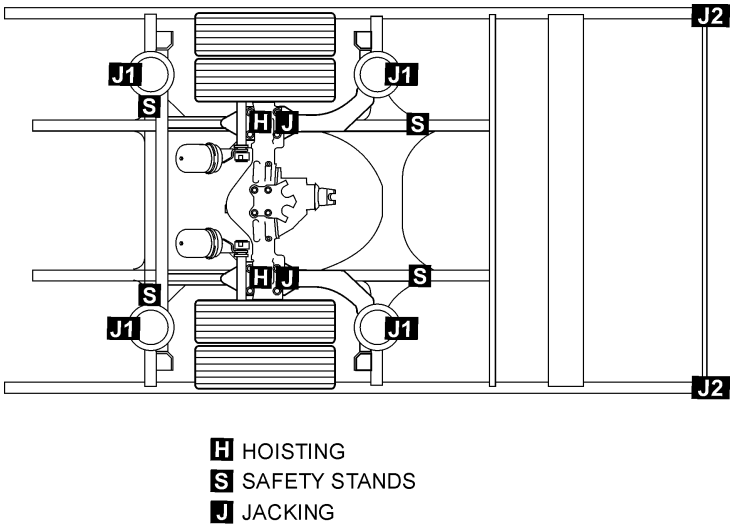


Figure 9 Rear Jack Positioning

5. Place heavy duty jack under air bag plate of suspension beam. See **Figure 9**.
6. If correct height is not achieved when jacking, place safety stands next to the jack, and lower bus on stand.
7. Place a block(s) under the jack and raise the vehicle until desired height is achieved.
8. Remove and replace tire(s).
9. Reverse the above procedure to complete the task.
10. Torque wheels to 500 FtLbs (677 Nm). **(See Figure 8)**

Vehicle Hoisting/Axle Lift

⚠ WARNING

Ensure all personnel stand clear of the vehicle before hoisting. The engine must be turned off while the vehicle is being lifted by a hoist.

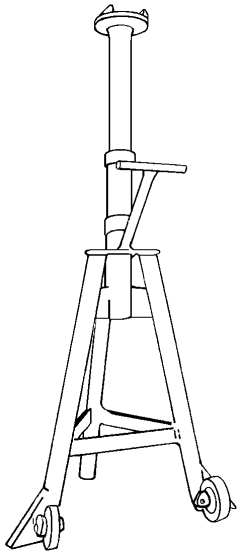


Figure 10 Hoist Safety Stand

CAUTION !

Do not hoist the vehicle by its suspension and leave it hoisted overnight. The suspension system air could leak causing the vehicle to sag and become dangerously unbalanced. If the vehicle must be left on a hoist for an extended period of time, place safety stands at both front and rear, roadside and curbside locations (see Figure 10).

1. Place the vehicle over the hoist and position the hoist adapter pads such that they contact the points as far outboard as possible.
2. Raise the hoist posts so that contact is made. Do not lift the vehicle.
3. Release the parking brake.

CAUTION !

If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain the air pressure in the suspension system.

4. Always inspect the hoist area, and make sure that nothing will interfere with, or cause damage to, the vehicle.

5. Ensure that the hoist adapter pads are still properly located, and then lift vehicle.

NOTE

In order to make the underside of the rear axle as symmetrical as possible for hoisting purposes, a specially designed jacking pad has been installed at the curbside hoisting position.

6. Lift the front and rear of vehicle at the same rate, maintaining correct level at all times.

CAUTION !

Ensure that the safety stands firmly contact the vehicle frames and do not interfere with the operation of the suspension. Do not lower the hoists after the vehicle is supported by the safety stands. The hoists are required to support the vehicle's suspension system.

7. Engage hoist safety locks and position four safety stands under the vehicle, two at the front and two at the rear.

CAUTION !

When lowering the vehicle, slow the descent when the wheels initially touch the ground to allow time for the air bags to inflate. Pinching of under-inflated air bags can cause damage to the suspension system.

Vehicle Towing

CAUTION !

Before towing vehicles equipped with a *HybriDrive*™ Propulsion System, remove both rear axles from the vehicle. Failure to comply will result in damage to the A/C Traction Motor and subsequently void warranty coverage of the Traction Motor.

Tow eyes are located on the front end and the rear end of the vehicle.

Front Tow Eyes

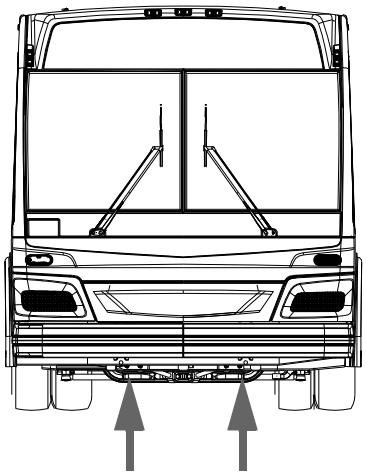


Figure 11 Front Tow Eyes

Only front tow eyes are to be used for towing the vehicle, with all wheels on the ground. If the front end of the vehicle must be lifted, the tow bar must be placed under the front jacking pads shown in **Figure 11**.

Rear Tow Eyes

Rear tow eyes are **not** to be used to tow the vehicle. Rear tow eyes are to be used only to position the vehicle (such as pulling the vehicle straight out of a ditch). If rear end lifting of the vehicle is required for towing, the tow adapters must be placed under the rear safety stand pads as shown in **Figure 10**.

CAUTION !

Exercise the following towing precautions to ensure that the vehicle will not suffer any structural damage. If the transit authority has its own towing procedures, compare them carefully with the procedures recommended below.

NOTE

You cannot start the engine by pushing or towing the vehicle.

General Precautions

1. Make sure that towing vehicle complies with all state, provincial, and local laws. These laws govern the required use of warning signals, night illumination, and speed limits.

2. A safety chain system is completely independent of primary towing attachments, must be used.
3. Never tow a vehicle over 35 m.p.h. (55 km/hr.).
4. Refrain from going under a vehicle that has to be lifted, unless the vehicle is properly blocked and supported.
5. Do not attempt any towing operation which might jeopardize the safety of the operator, bystanders, or other motorists.
6. Secure all loose or protruding parts of damaged vehicles prior to towing.
7. If the rear wheels are to be left on the ground during the tow (front towing only), make sure to:
   a. Place the shift selector in the Neutral position;
   b. As a primary and recommended option, mechanically disconnect the driveshaft; or
   c. As a secondary option, remove the rear axle stub shafts, and cover the shaft openings to prevent loss of lubricant and ingress of foreign material.
8. Provide a minimum auxiliary air supply of 70 psi (normally from the towing vehicle) to the vehicle being towed. This allows adequate air to hold off the spring brakes and maintain the suspension height.

Front Towing

Towing Bus from Front Frame with 3 Stage Tow Truck Stinger

In order to tow the bus, a "double pick up" procedure will have to be performed. This procedure consists of lifting the vehicle at the front pick-up jack pads with bottle jack (10T), floor jack, or with the tow truck stinger from under the front frame. The vehicle is to be lifted up to the point that a wooden block (4" x 4") could be placed under each tire. Once the wooden blocks are in place, the forks should be installed at the stinger, then the bus is to be lifted for the second time using the stinger.

Flat Tow

CAUTION !

The two tow eyes are provided for use with a tow bar only. Lifting the vehicle by the tow eyes may result in structural damage, do not lift the vehicle by the tow eyes.

1. Locate the tow eyes on the main frame braces just beneath the front bumper **(see Figure 11)**.

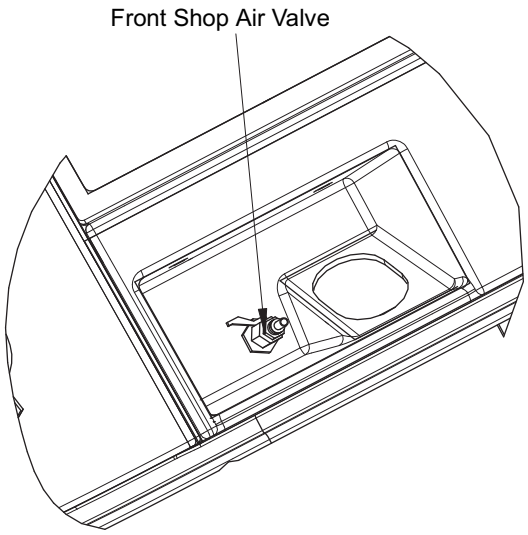


Figure 12 Front Shop Air Valve

2. Locate the front shop air filler valve behind the windshield washer fill door **(see Figure 12)**.
3. Connect the towing vehicle's auxiliary air supply to the air filler valve of vehicle to be towed.

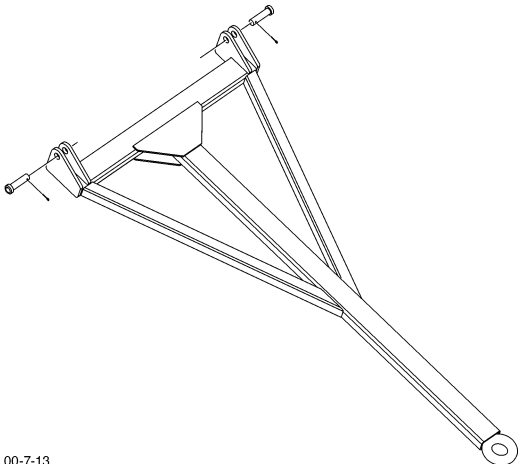


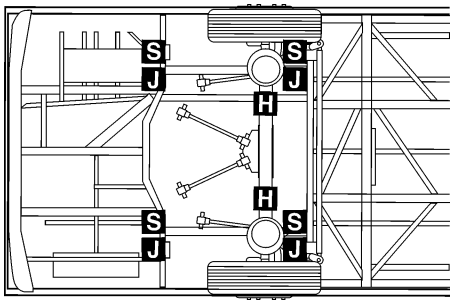
Figure 13 Tow Bar Assembly

4. Attach the tow bar **(Figure 13)** to the front tow eyes and secure it to the towing vehicle. Ensure that the necessary safety precautions are observed, connecting devices are engaged and a secondary fastening system (i.e., safety chain) is secure.
5. Ensure that the shift selector is in the Neutral position and the rear axle stub shafts are removed.

Lift Tow

CAUTION !

Never lift tow the vehicle by the front bumper frame.



S SAFETY STANDS
J JACKING
H HOISTING

00-7-11

Figure 14 Front Lift Tow Grasp Points

1. Extend the tow truck lifting arms so that the claws grasp the vehicle frame at the jacking/safety stand positions just forward of the front wheels **(see Figure 14)**.

NOTE

A 7’ stinger boom extension rated for 20,000 lbs is the minimum requirement when towing from the front with 2" forks.

2. Ensure that the necessary safety precautions are observed, connecting devices are engaged and a secondary fastening system (i.e., safety chain) is secure.
3. Connect the tow truck’s auxiliary air supply to the front air filler valve of vehicle to be towed.
4. Ensure that the shift selector is in the Neutral position, the rear axle stub shafts are removed.
5. Lift the front of the vehicle until the front wheels leave the ground and commence the tow.

Rear Towing

Towing Bus from Rear Frame with 3 Stage Tow Truck Stinger

In order to tow the bus, a "double pick up" procedure will have to be performed. This procedure consists of lifting the vehicle at the rear pick-up jack pads with bottle jack (10T), floor jack, or with the tow truck stinger from under the rear frame. The vehicle is to be lifted up to the point that a 4" x 4" wooden block 4" x 4" could be placed under each tire. Once the wooden blocks are in place, the forks should be installed at the stinger, then the bus is to be lifted for the second time using the stinger.

CAUTION !

Do not flat tow the vehicle from the rear as it will be too difficult to maneuver.

NOTE

A 9’ stinger boom extension rated for 20,000 lbs is the minimum requirement when towing from the rear with 4" forks.

Using Towing Arms

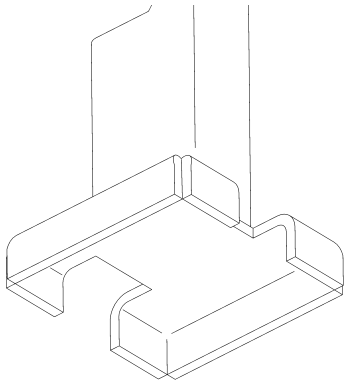


Figure 15 Jack Pad

1. Ensure the tow arm adapters properly engage the towing/jack pads. **(See Figure 15)**

NOTE

Lifting and towing pads are located on the rear transverse frame, offset towards the roadside of the vehicle.

2. Ensure that all safety devices (safety chains, etc.) are in place.

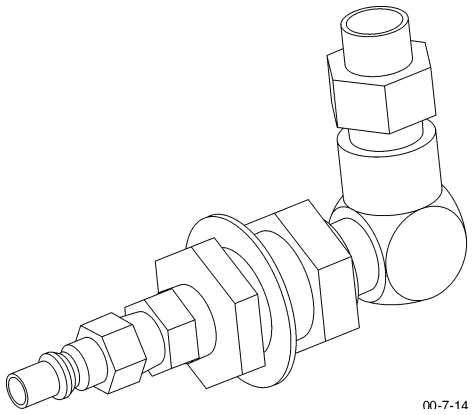


Figure 16 Rear Shop Air Valve

3. Connect the towing vehicle's auxiliary air supply line to the rear shop air filler valve **(Figure 16)**.
4. Secure the steering wheel to minimize the movement of the front of the vehicle.
5. Lift the vehicle until the rear wheels leave the ground and commence the tow.

NOTE

The rear filler valve is located in the air dryer compartment on the roadside of the vehicle, in front of the rear wheels.

Using a Tow Chain

1. Position a section of protective lumber under the bumper and wrap the towing chain around the chassis frame (on both sides) at least once.
2. Make sure that all safety devices (safety chains, etc.) are in place.
3. Connect the towing vehicle's auxiliary air supply line to the rear shop air filler valve in the engine compartment.
4. Secure the steering wheel to minimize the movement of the front of the vehicle.
5. Release the parking brake and commence the tow.

Orion VII NG Clean Diesel

Body and Axle Data

Table 1 lists the body dimensions, axle model numbers, and capacities.

Table 1 Body and Axle Data (Model 07.501)

ITEM	DIMENSION (US/METRIC)
Vehicle Length (Over Body)	40.39 ft / 12.31 m
Vehicle Length (Over Bumpers)	41.19 ft / 12.55 m
Vehicle Width (Over Body)	101.87 in / 258.75 cm
Vehicle Width (Including Mirrors)	123.44 in / 313.54 cm
Vehicle Height	126 in / 320.04 cm
Wheelbase	286 in / 726.44 cm
Maximum Turning Radius	43.4 ft / 13.2 m
Front Axle (Meritor FH-946 Std.)	16,500 lb / 7484.27 kg Capacity
Rear Axle (Meritor 71163 Std)	28,660 lb / 12,999.96 kg Capacity (5.63 Axle Ratio)
Wheel Size	Firestone Acurride 22.5 in X 8.25 in (Steel)
Tire Size*	R23 BridgestoneE R192FZ Rating H, 305/70R22.5

***The bus must not be operated at speeds exceeding 20 MPH when tire chains have been installed.**

Table 2 Propulsion System

COMPONENT	MODEL NUMBER/TYPE
Engine	EPA10 - Cummins ISL™ Diesel 280 HP
Transmission	Allison B400R

Fluid and Fuel Capacities

NOTE

The information contained in the following fluid capacity table are estimated capacities.

Table 3 Fluid Capacities (Sheet 1 of 2)

SYSTEM/COMPONENT	MODEL	CAPACITY (US/METRIC)
Engine Oil (Including Filters)	Mobil Delvac 1300S SAE 15W40	7 US Gallons / 26.5 Liters
Transmission Fluid	Castrol Transynd	5 US Gallons / 18.9 Liters
Fuel Tank	Ultra Low Sulfur Diesel No. 1-D	125 US Gallons / 473.2 Liters
DEF Fluid	Stableguard	11.4 US Gallons / 43.3 Liters
Cooling (Engine Only)	Ethylene Glycol	2.3 US Gallons / 9 Liters
Front / Rear Axle Bearings	NL G1 Grade (Grease)	4 oz / 0.12 Liters
Rear Axle Differential Fluid	Mobil Synthetic 75W90*	5.5 US Gallons / 20/8 Liters

Table 3 Fluid Capacities (Sheet 2 of 2)

SYSTEM/COMPONENT	MODEL	CAPACITY (US/METRIC)
Power Steering Fluid	Castrol Transynd	1 US Gallon / 3.8 Liters
Windshield Washer Fluid	N/A	6 US Gallons / 22.7 Liters
Wheelchair Ramp	Castrol Transynd	0.2 Gallon / 0.76 Liters

** NOTE: Mixture of different oils (petroleum based vs. semisynth or fully synthetic) is not allowed.*

Maintenance Precautions

Information contained in this manual is intended to supplement, rather than replace, standard shop practices and safety procedures.

Make safety the number one priority during any maintenance task.

To reduce the risk of personal injury and/or vehicle damage during maintenance, adhere to the following precautions:

- Observe and follow all the NOTES, CAUTIONS, WARNINGS, and DANGER symbols in this manual.
- If a part requires replacement, replace with the same part, or a part of higher quality.

Metric Fasteners

Follow these guidelines when fastener replacement is required:

WARNING

Using incorrect fasteners can result in personal injury and/or vehicle damage or malfunction. Use only compatible replacement fasteners.

- Make sure replacement fasteners, whether metric or imperial, have the same measurements and strength as those being replaced.
- If in doubt about the compatibility of replacement fasteners, contact Daimler Buses North America.

Jacking, Hoisting, and Towing

Vehicle Jacking and Hoisting

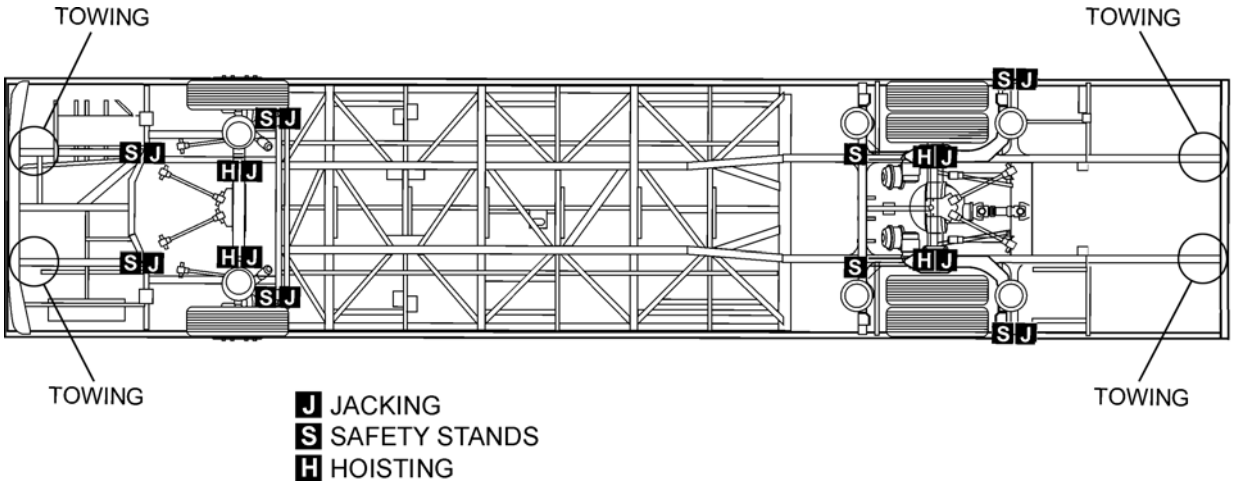


Figure 4 Jacking, Hoisting, and Towing Points

Equipment Requirements

WARNING

Failure to correctly place floor jacks, safety stands, and hoisting equipment can result in personal injury and/or vehicle damage. Place floor jacks, safety stands, and hoisting equipment within the areas designated in the procedures.

Floor Jacks or Stands

Each floor jack or stand must have a minimum capacity of at least half of the floor hoist capacity required for that end of the vehicle.

Floor Hydraulic Hoist

If floor hydraulic hoists are being used to lift the vehicle, the front hoist must have a minimum capacity of 5 tons (4550 kg). The rear floor hoist must have a minimum capacity of 10 tons (9100 kg).

Safety Precautions

1. Position the vehicle on a hard, level, flat surface when preparing to lift it.

2. Never go beneath a vehicle that is supported only by floor jacks.

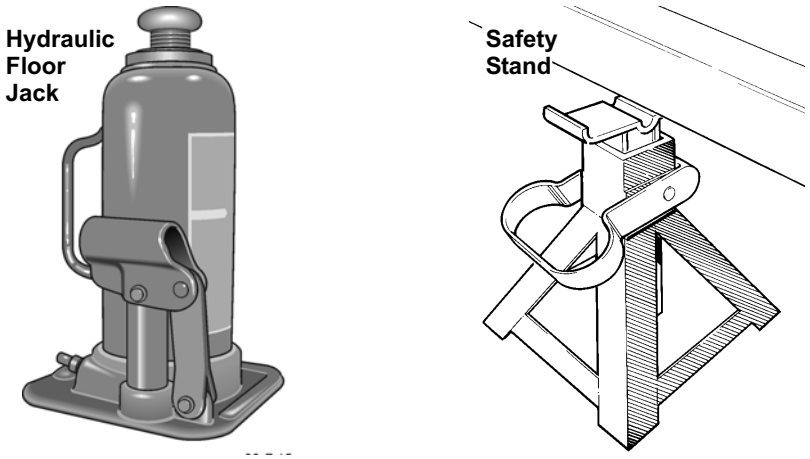


Figure 5 Hydraulic Floor Jack and Safety Stand

3. Never leave the vehicle suspended solely by floor jacks, always use both floor jacks and safety stands **(see Figure 5)**.
4. When only one side (or end) of the vehicle is to be raised (e.g., changing a tire), chock the front and rear wheels on the side opposite the wheel being raised.
5. Place the shift selector in Neutral and release the parking brakes prior to jacking the vehicle.
6. Do not start, or run an engine when the vehicle is being supported by floor jacks alone. Floor jacks are used for lifting only. Support the vehicle with safety stands once lifted.
7. To remove a flat tire, raise the vehicle just enough so an inflated spare tire will clear the floor/ground when installed.
8. Always wear eye protection when working under the vehicle.
9. Locate floor jacks and safety stands as detailed in this section of the manual. All support equipment must meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - 8 inch diameter lifting pad
   - 4 3/4 inch spacing between the pad ears

Vehicle Pick Up and Support

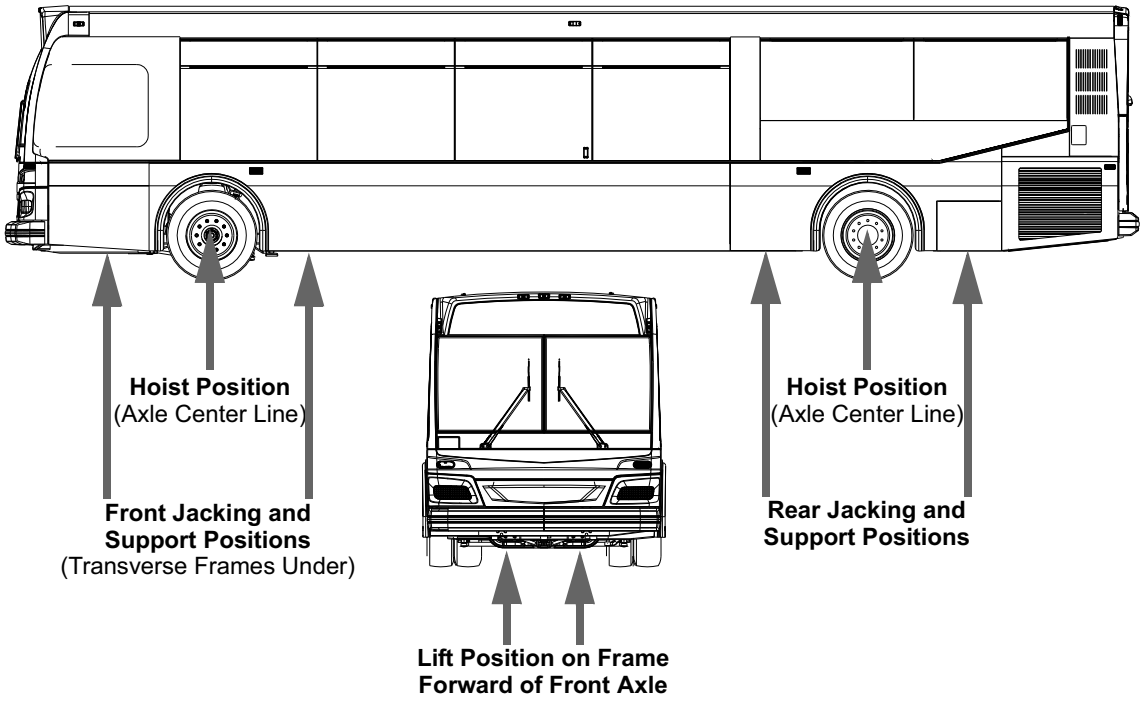


Figure 6 Pick Up and Support Locations

The Orion VII EPA10 bus is a "low floor" vehicle with a lattice-type chassis containing no continuous longitudinal main support beams. There are several locations along the chassis (mainly on the transverse structure) which are the recommended pick up and support points, in addition to the normal axle hoist points. These sites, along with the location of the front and rear towing points, are shown in **Figure 4** and **Figure 6**.

Raising and Supporting the Vehicle

CAUTION !

Lifting the front or rear of the vehicle can be accomplished using devices such as jacks, tow truck lifting arms, etc. Although the following procedure mainly describes lifting with floor jacks, the basic vehicle and personal safety precautions would apply to all lifting devices and methods.

1. Use blocks/chocks at the front or rear wheels, as applicable, to prevent vehicle movement.
2. Ensure that the shift selector is in the Neutral position, and then release the parking brakes.

NOTE

If vehicle air pressure is low or unavailable, connect a filtered auxiliary/shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension system.

3. For front lift, use two floor jacks and position the concave head of each jack with the lift pad. **(See Figure 4)**
4. To rear lift, use two floor jacks and position the concave head of each jack with the lift pad.

CAUTION !

Do not lift the vehicle from the tow eyes. The front tow eyes are provided for flat tow use use with a tow bar only and the rear tow eyes are to be used only to position the vehicle (such as pulling the vehicle out of a ditch). Attempting to use the tow eyes improperly will cause structural damage to the bus.

5. Raise each floor jack until the center of the lifting pad contacts the frame, and position securely.
6. Raise each floor jack alternately so that the vehicle is basically level as it is raised.
7. Raise the vehicle to the required height, and adjust the safety stands under the frame section.
8. To lower the vehicle:
   a. Raise the vehicle slightly, using the floor jacks, and then remove the safety stands.
   b. Slowly relieve the pressure from the floor jacks to lower the vehicle evenly to the ground.

Changing a Flat Tire

Equipment Requirements

- Replacement tire(s)
- 2 heavy duty hydraulic bottle-type jacks
- wedge block
- creeper
- lug wrench and bar
- adjustable safety stand
- torque wrench

- 2 8" x 8" x 12" blocks

Safety Precautions

CAUTION !

Place jacks and safety stands within the areas designated in the following procedures. Failure to do so could result in personal injury and/or vehicle damage.

NOTE

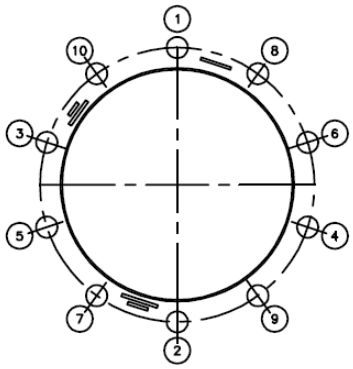
If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain air pressure in the suspension.

1. Use chocks and blocks to prevent vehicle movement.
2. Ensure that the shift selector is in the Neutral position. Release the parking brakes prior to raising the vehicle with floor jacks.
3. Make sure that the floor jacks meet or exceed the following requirements:
4. Ensure that the shift selector is in the Neutral position. Release the parking brakes prior to raising the vehicle with floor jacks.
5. Ensure that the floor jacks meet or exceed the following requirements:
6. Observe the following precautions:
   - Minimum lift capacity rating of 10 tons
   - 8 inch diameter lifting pad
   - 4 3/4 inch spacing between the pad ears
7. If bottle jacks are used, make sure that they meet or exceed the following requirements:
   - Minimum lift capacity rating of 10 tons
   - Maximum height 10 inches.

Front Flat Tire

1. Ensure that the vehicle suspension is fully raised, and that the kneeling system is not engaged.
2. Maneuver the floor jack into position from the roadside of the vehicle. **(See Figure 4)**
3. Position the jack lifting pad directly below the transverse frame either in front or behind the flat tire.
4. Raise the jack until the center of the lifting pad contacts the frame. Make sure the jack is securely positioned beneath the jacking point.
5. Loosen the wheel nuts but **Do Not Remove the Nuts**.
6. Raise the vehicle so that the tire just clears the ground.

7. Place the safety stands in the positions shown in **Figure 4.**
8. Lower the vehicle onto the safety stands and remove the wheel.
9. Reverse the above procedure to complete the task.



Torque:
450-500 FtLbs
(677Nm)

Figure 7 Wheel Tightening Sequence

10. Torque lug nuts to 450-500 FtLbs (677 Nm) as shown in **Figure 7.**

Rear Flat Tire

1. Place shift selector in Neutral position.
2. Apply the park brake.
3. Place heavy duty jack under air bag plate of suspension beam. **Figure 4**
4. Loosen but Do Not Remove the Wheel Nuts.
5. Jack up axle to an appropriate height for tire removal/replacement.
1. Place shift selector in Neutral position.
2. Apply Park Brake.
3. Place wedge block under front tire.
4. Place a heavy duty jack under the air bag plate of suspension beam. **See Figure 4)**
5. If correct height is not achieved when jacking, place safety stands next to the jack, and lower bus on stand.
6. Place a block(s) under the jack and raise the vehicle until desired height is achieved.
7. Remove and replace tire(s).
8. Reverse the above procedure to complete the task.
9. Torque wheels to 450-500 FtLbs (677 Nm). **(See Figure 7)**

Vehicle Hoisting/Axle Lift

WARNING

Ensure all personnel stand clear of the vehicle before hoisting. The engine must be turned off while the vehicle is being lifted by a hoist.

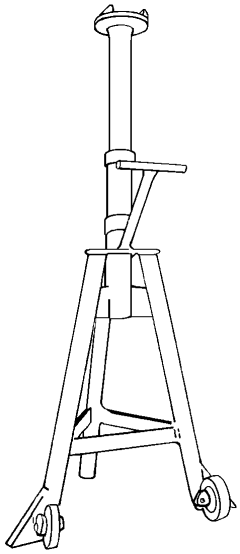


Figure 8 Hoist Safety Stand

CAUTION !

Do not hoist the vehicle by its suspension and leave it hoisted overnight. The suspension system air could leak causing the vehicle to sag and become dangerously unbalanced. If the vehicle must be left on a hoist for an extended period of time, place safety stands at both front and rear, roadside and curbside locations. (See Figure 8)

1. Place the vehicle over the hoist and position the hoist adapter pads such that they contact the points as far outboard as possible.
2. Raise the hoist posts so that contact is made. **Do not lift the vehicle.**
3. Release the parking brake.

CAUTION !

If vehicle air pressure is low or unavailable, connect a filtered shop air supply (70 psi minimum) to the air system. This will hold off the spring brakes and maintain the air pressure in the suspension system.

4. Always inspect the hoist area, and make sure that nothing will interfere with, or cause damage to, the vehicle.
5. Ensure that the hoist adapter pads are still properly located, and then lift vehicle.

NOTE

In order to make the underside of the rear axle as symmetrical as possible for hoisting purposes, a specially designed jacking pad has been installed at the curbside hoisting position.

6. Lift the front and rear of vehicle at the same rate, maintaining correct level at all times.

CAUTION !

Ensure that the safety stands firmly contact the vehicle frames and do not interfere with the operation of the suspension. Do not lower the hoists after the vehicle is supported by the safety stands. The hoists are required to support the vehicle's suspension system.

7. Engage hoist safety locks and position four safety stands under the vehicle, two at the front and two at the rear.

CAUTION !

When lowering the vehicle, slow the descent when the wheels initially touch the ground to allow time for the air bags to inflate. Pinching of under-inflated air bags can cause damage to the suspension system.

Vehicle Towing Procedure

Safety Precautions

CAUTION !

Exercise the following towing precautions to ensure that the vehicle will not suffer any structural damage. If the transit authority has its own towing procedures, compare them carefully with the procedures recommended below.

CAUTION !

Do not lift the vehicle from the tow eyes. The front tow eyes are provided for flat tow use use with a tow bar only and the rear tow eyes are to be used only to position the vehicle (such as pulling the vehicle out of a ditch). Attempting to use the tow eyes improperly will cause structural damage to the bus.

NOTE

You cannot start the engine by pushing or towing the vehicle.

1. Make sure that towing vehicle complies with all state, provincial, and local laws. These laws govern the required use of warning signals, night illumination, and speed limits.
2. A safety chain system is completely independent of primary towing attachments, must be used.
3. Never tow a vehicle over 35 mph (55 km/hr.).
4. Refrain from going under a vehicle that has to be lifted, unless the vehicle is properly blocked and supported.
5. Do not attempt any towing operation which might jeopardize the safety of the operator, bystanders, or other motorists.
6. Secure all loose or protruding parts of damaged vehicles prior to towing.
7. If the rear wheels are to be left on the ground during the tow (front towing only), make sure to:
   a. Place the shift selector in the Neutral position;
   b. As a primary and recommended option, mechanically disconnect the driveshaft; or

c. As a secondary option, remove the rear axle stub shafts, and cover the shaft openings to prevent loss of lubricant and ingress of foreign material.

8. Provide a minimum auxiliary air supply of 70 psi (normally from the towing vehicle) to the vehicle being towed. This allows adequate air to hold off the spring brakes and maintain the suspension height.

Front Towing

Flat Tow

CAUTION !

The front tow eyes are provided for use with a tow bar only. Do not lift the vehicle by the tow eyes. Lifting the vehicle by the tow eyes may result in structural damage.

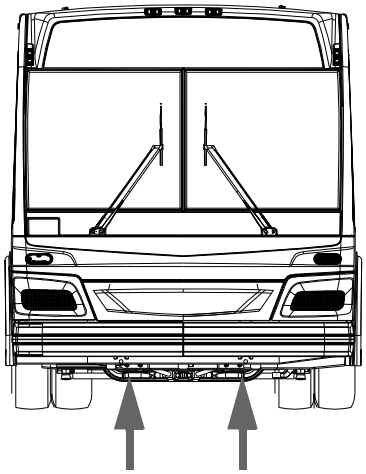


Figure 9 Front Tow Eyes

1. Locate the tow eyes on the main frame braces just beneath the front bumper. **(See Figure 9)**

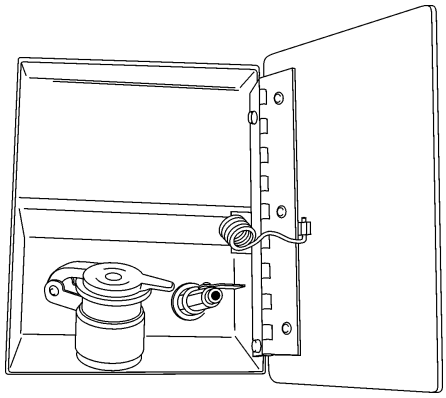


Figure 10 Front Shop Air Valve

3. Locate the front shop air filler valve behind the windshield washer fill door. **(See Figure 10)**
4. Connect the towing vehicle's auxiliary air supply to the air filler valve of vehicle to be towed.

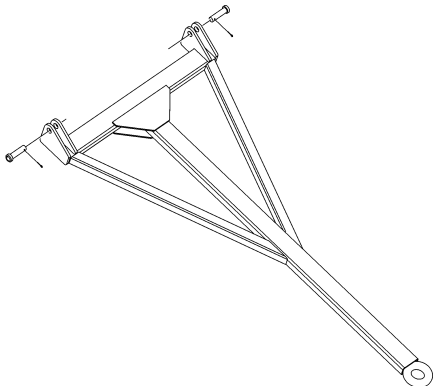


Figure 11 Tow Bar Assembly

CAUTION !

The use of safety chains is required for the towing of EPA10 buses.

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5. Attach the tow bar **(Figure 11)** to the front tow eyes and secure it to the towing vehicle. Ensure that the necessary safety precautions are observed connecting devices are engaged, and a secondary fastening system (i.e., safety chain) is secure.
6. Ensure that the shift selector is in the Neutral position and the rear axle stub shafts are removed.
7. Commence the tow.

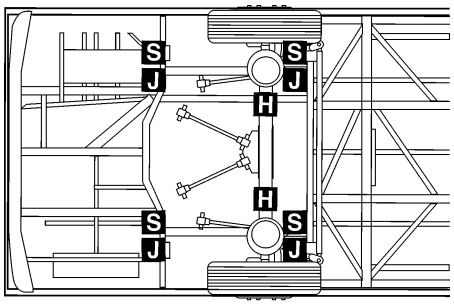
Lift Tow

Double Pick Up Method

In order to lift tow the bus, a "double pick up" procedure will have to be performed. This procedure consists of lifting the vehicle at the front pick-up jack pads with bottle jack (10T), floor jack, or with the tow truck stinger from under the front frame. The vehicle is to be lifted up to the point that a wooden block (4" x 4") could be placed under each tire. Once the wooden blocks are in place, the forks should be installed at the stinger, then the bus is to be lifted for the second time using the stinger.

CAUTION !

Never lift tow the vehicle by the front bumper frame.



S SAFETY STANDS
J JACKING
H HOISTING

00-7-11

Figure 12 Front Lift Tow Grasp Points

1. Extend the tow truck lifting arms so that the claws grasp the vehicle frame at the jacking/safety stand positions just forward of the front wheels **(see Figure 12)**.

NOTE

A 7’ stinger boom extension rated for 20,000 lbs is the minimum requirement when towing from the front with 2" forks.

2. Ensure that the necessary safety precautions are observed, connecting devices are engaged and a secondary fastening system (i.e., safety chain) is secure.
3. Connect the tow truck’s auxiliary air supply to the front air filler valve of vehicle to be towed.
4. Ensure that the shift selector is in the Neutral position, the rear axle stub shafts are removed.

5. Lift the front of the vehicle until the front wheels leave the ground and commence the tow.

Pin Receiver Method

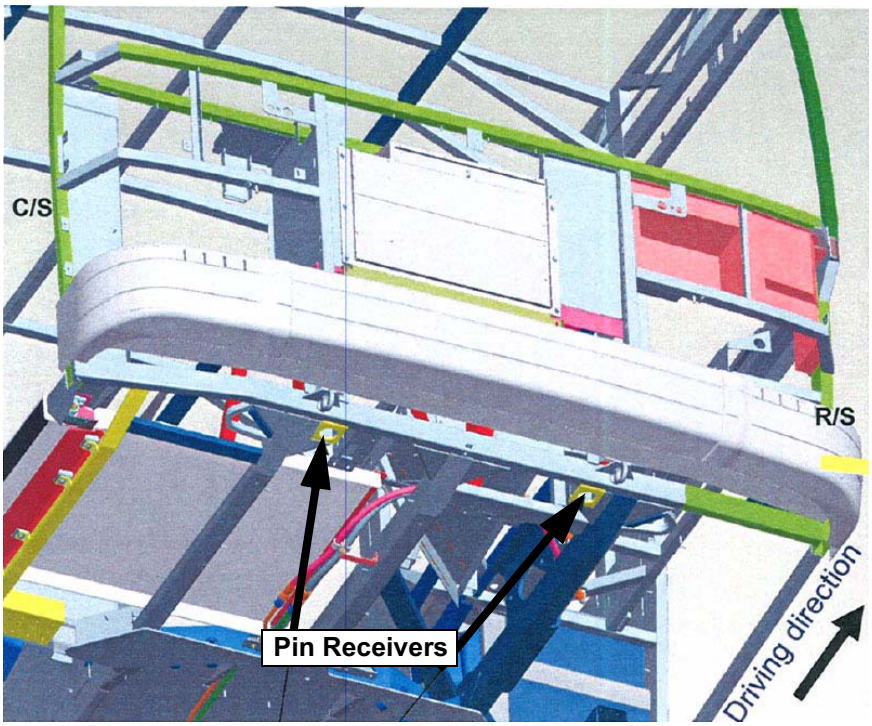


Figure 13 Front Pin Receivers

1. Position the tow arm adapter to properly engage the pin receivers. **(See Figure 13)**
2. Lift the tow arm until the pins on the tow arm adapter are fully seated in the pin receivers.

CAUTION !

The use of safety chains is required for the towing of EPA10 buses.

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3. Install safety chains to front attachment points.
4. Disconnect the vehicle driveshaft.
5. Locate the front shop air filler valve behind the windshield washer fill door. **(See Figure 10)**
6. Connect the towing vehicle's auxiliary air supply to the air filler valve of vehicle to be towed.
7. Attach tow lights.

8. Lift the vehicle until the front wheels leave the ground and commence the tow.

Rear Towing

CAUTION !

Do not flat tow the vehicle from the rear as it will be too difficult to maneuver.

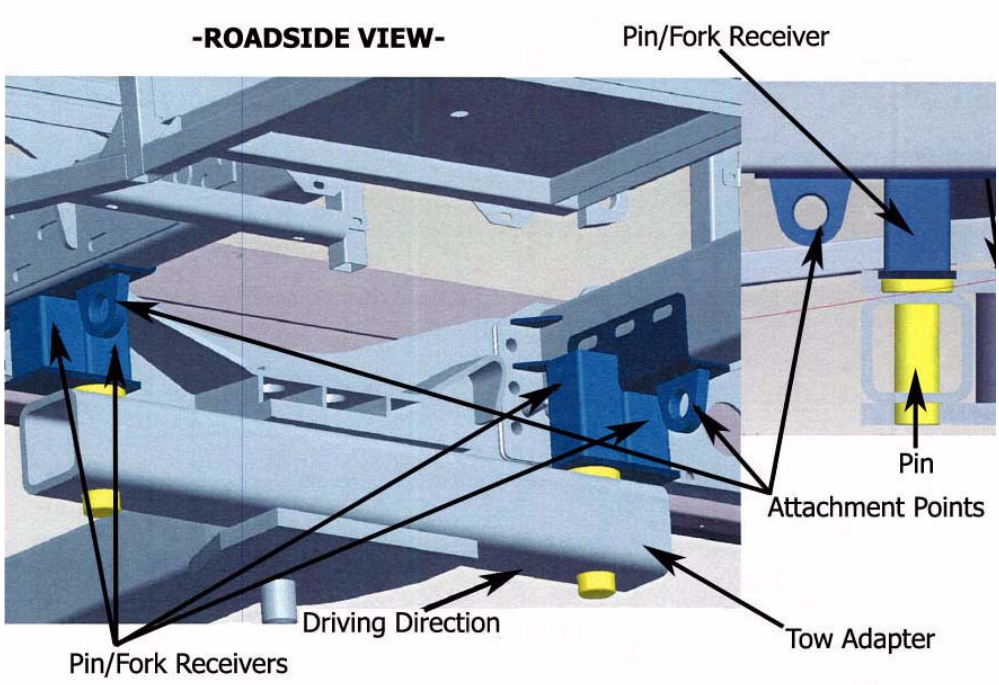


Figure 14 Rear Pin Receivers and Attachment Points

1. Position the tow arm adapter to properly engage the pin receivers. **(See Figure 14)**
2. Lift the tow arm until pins (or forks) on the tow arm adapter are fully seated in the pin receivers. **(See Figure 14)**

CAUTION !

The use of safety chains is required for the towing of EPA10 buses.

3. Install safety chains to attachment points. **(See Figure 14)**

4. Disconnect the vehicle driveshaft.

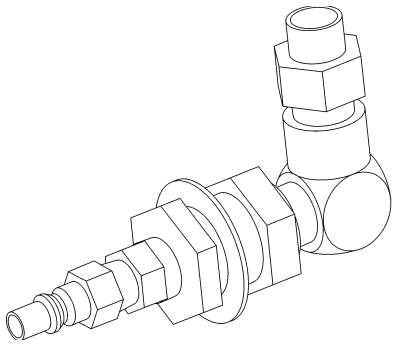


Figure 15 Rear Shop Air Valve

NOTE

The rear filler valve is located in the air dryer compartment on the roadside of the vehicle, in front of the rear wheels.

5. Connect the towing vehicle's auxiliary air supply line to the rear shop air filler valve **(Figure 15)**.
6. Secure the steering wheel to minimize the movement of the front of the vehicle.
7. Attach tow lights.
8. Lift the vehicle until the rear wheels leave the ground and commence the tow.

Friendly Wheel-Trans

4 - JACKING AND TOWING

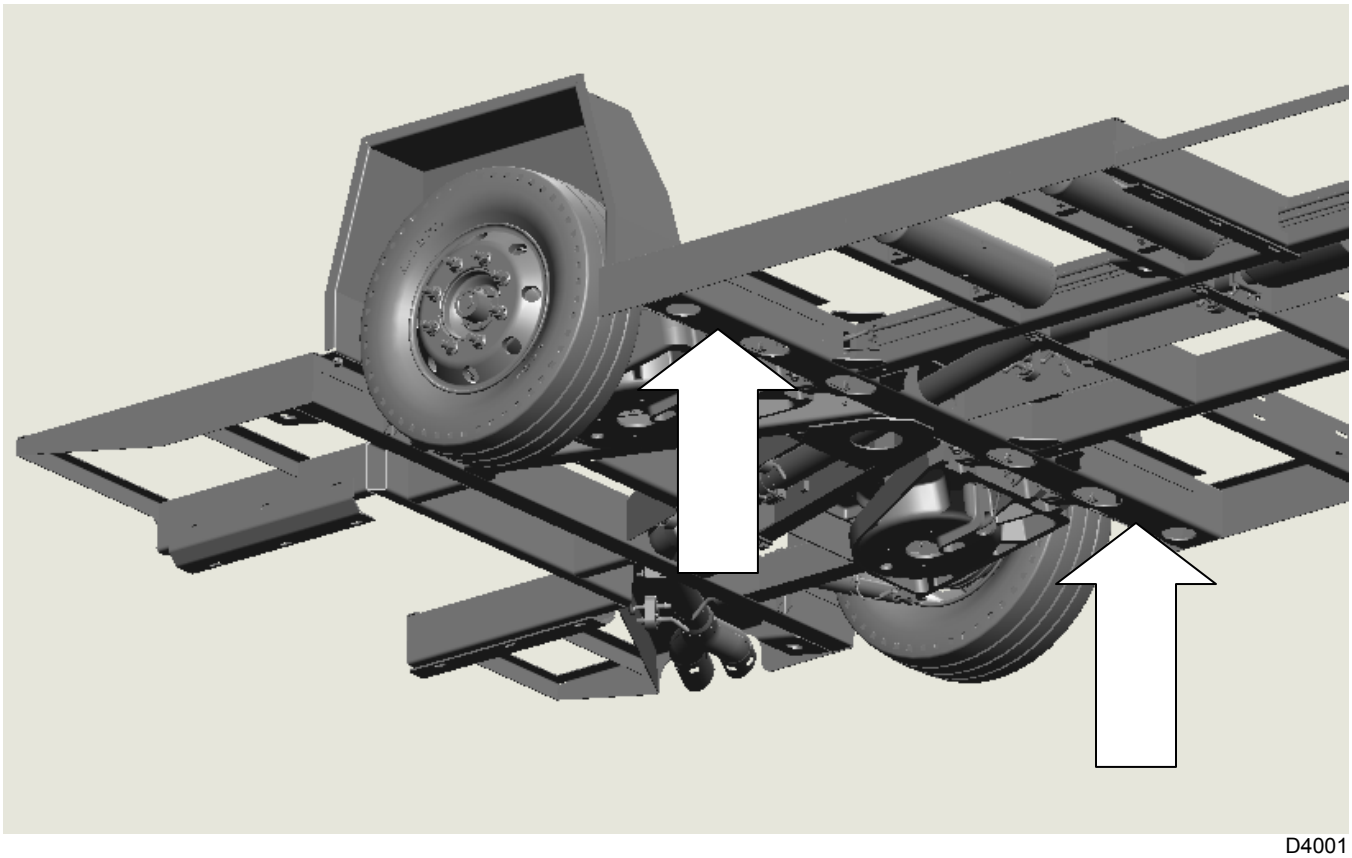
RAISING THE VEHICLE

Refer to Ford Workshop Manual section 100-02 for lifting point locations on the Ford Front chassis.

Always follow the manufacturer's operating procedures and instructions for the Lifting equipment that is used. Be safe and vigilant and never use faulty, damaged or worn-out equipment. Never overload any lifting equipment and work within the load capacities of all gear.

- The header beam located in front of the Rear wheels must be used for lifting the vehicle.
- Position the lifting Equipment, Jack or Stand as indicated below.
- Ensure the Vehicle remains in a horizontal position while raising the front and rear at the same time.

Rear Frame Vehicle Lifting Points



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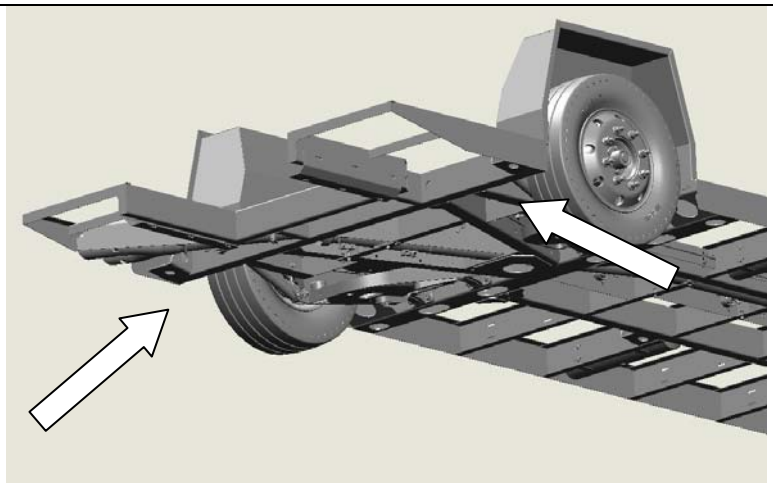
TOWING THE VEHICLE

NOTE

- To prevent drive train damage make sure the park brake is released and the vehicle is in neutral. Make sure the front wheels are turned straight.
- The hook brackets are located behind the rear header beam just behind the rear wheel on each side of the vehicle. Hook a "J-hook" with chain through the bottom hole of the bracket. The vehicle can now be pulled safely out to the loading area.
- It is recommended to use a flat bed to transport the vehicle with all the wheels of the ground. However, a wheel lift may be used to lift the front of the vehicle so long as, depending on vehicle configuration, the following preparations are met:
  1. The rear air springs are inflated to normal operating condition. Make sure the kneel switch is off.
  2. After lifting the front of the vehicle, make sure that there is sufficient clearance between the road and the vehicle.

Hook Brackets - Rear



D4002

Towing a Low Floor Bus

D4003

RAISING THE VEHICLE SUSPENSION - MANUAL INFLATION

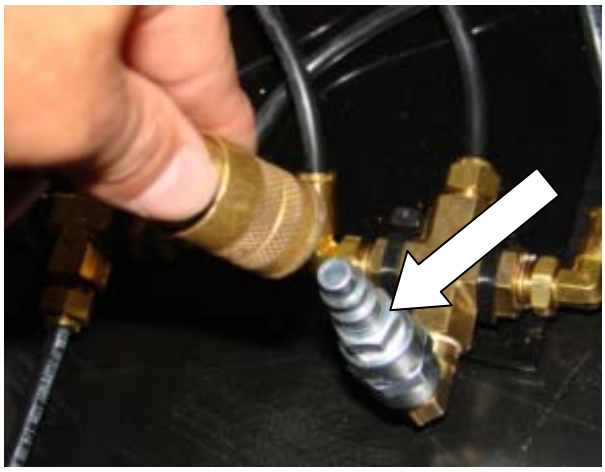
NOTE CAUTION

- In the event where the vehicle's electrical system is not functioning and vehicle ride height cannot automatically be corrected via the manifold, the vehicle's suspension height (air springs) may be manually adjusted (inflated and/or deflated).
- Stay clear from underneath the vehicle and all suspension components while adjusting suspension height.
- The rear air springs can individually be adjusted both LHS and RHS.
- The two front air springs are connected together and will respond simultaneously.
- The MAXIMUM inflation pressure is 100 psi.
- A deflated air spring must have a minimum of approximately 10 psi air pressure internally. Not doing so may cause the flex member to buckle instead of rolling over the piston.

- ❖ Do not exceed the maximum inflation pressure.
- ❖ Do not exceed the maximum extended height. Doing so may cause structural damage to the air spring assembly.
- ❖ Do not put the air spring assembly in torsion.
- ❖ Do not allow a machine to continue to operate on a deflated air spring assembly.

MANUAL INFLATION PROCEDURE

1. Locate the quick connect fitting below the manifold and ensure it is free from obstruction and not plugged or blocked.
2. Obtain a compressed air source and verify that the pressure is regulated and set to a maximum of 100 psi.
3. Connect the compressed air hose to the quick connect fitting.

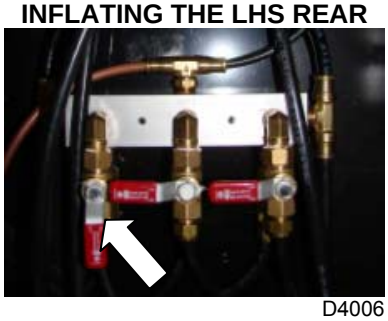


D4004

D4005

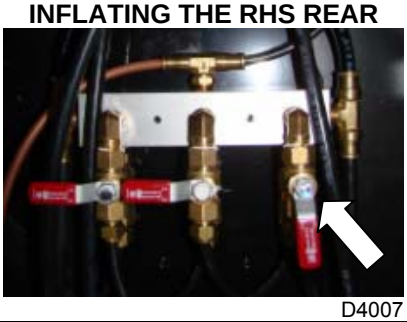
4. Slowly open the corresponding ball valves one at a time to adjust the air springs.

INFLATING THE LHS REAR



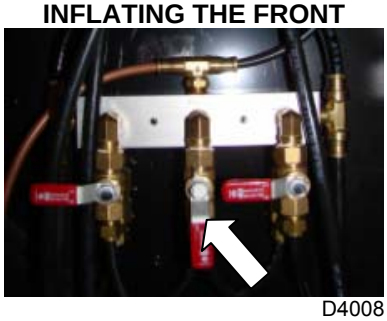
D4006

INFLATING THE RHS REAR



D4007

INFLATING THE FRONT



D4008

5. After the desired suspension height has been attained, close all the valves and disconnect the compressed air hose.

ALL VALVES CLOSED

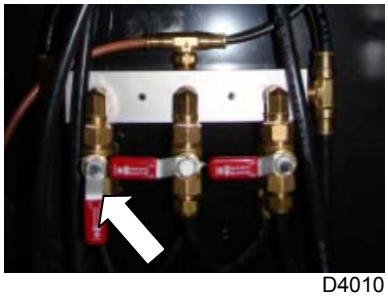
D4009

MANUAL DEFLATION PROCEDURE

1. Locate the quick connect fitting below the manifold and ensure it is free from obstruction and not plugged or blocked.

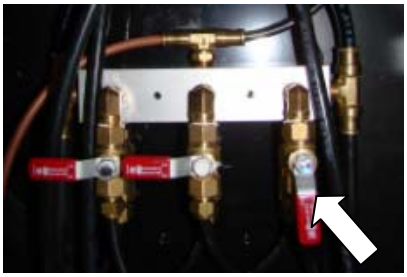
2. To lower the suspension, carefully open the individual ball valves one at a time to release air spring pressure.

DEFLATING THE LHS REAR



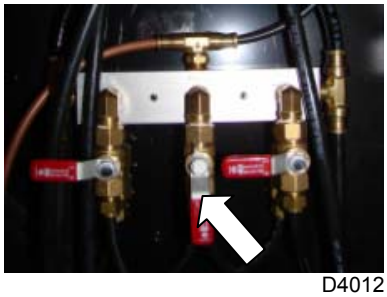
D4010

DEFLATING THE RHS REAR



D4011

DEFLATING THE FRONT



D4012

3. Close all the valves after the desired suspension height has been attained.

ALL VALVES CLOSED

D4013

Wheel-Trans
Friendly Bus Instructions

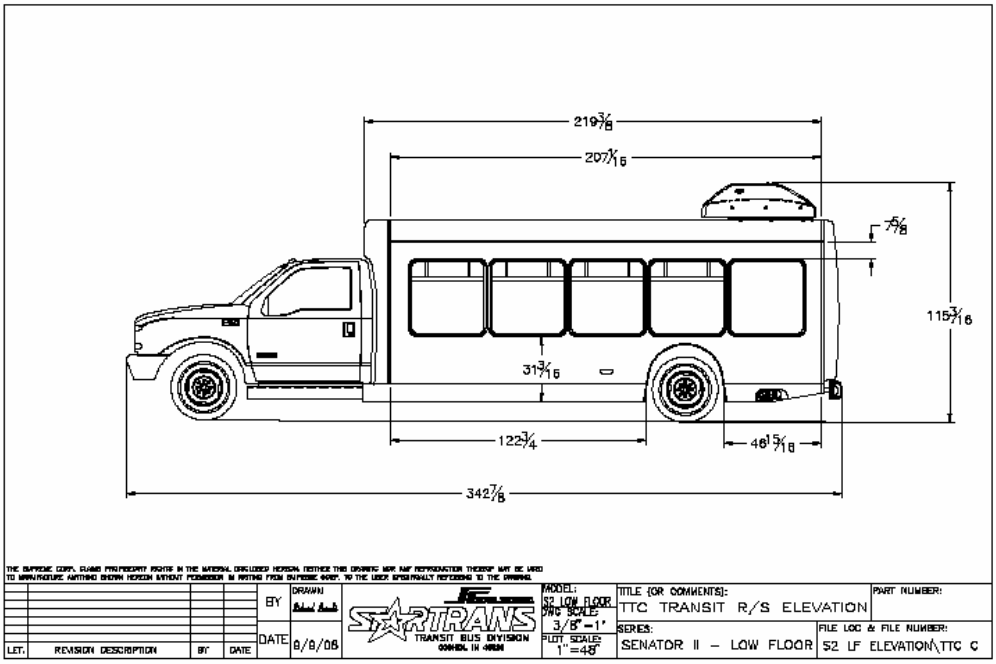
GENERAL STATISTICS:

Length:	28'
Width:	96"
Height:	110" (with A/C unit) W/ Air lift not engaged
Tail swing:	12”
Width of Front Track:	7’ or 84”
Width of Rear Track:	8’ 10” or 94”"
Engine:	6.4L Power Stroke Turbo Diesel
Transmission:	4 speed Heavy Duty with column controlled Overdrive
G V W :(occupied)	7,258 kgs (approximately 16,000 lbs.) (8 seated, 5 tie down)
Fuel:	#1 Grade Diesel
Passenger Capacity:	5 mobility device locations, 8 ambulatory customer locations.

FEATURES:

- Front Wheel Drive.
- Power steering.
- Power 6 way driver’s seat with armrest.
- Manual parking foot brake.
- Anti Lock brakes installed on all wheel discs.
- Four wheel lock system.
- Auxiliary Control Switch Panel.
- Air Lift
- Amerex V-25 Automatic engine fire suppression system.
- Capacity: 5 mobility device locations, 8 ambulatory customer locations.
- 12 volt electric system with a manual electrical disconnect.
- Power adjusted open and closed side mirrors.
- Front fender mount convex mirror.
- Intermittent windshield wipers with heated washer.
- Air conditioning: Dual Zone (customer/driver areas).
- Daytime running lights and headlights.
- Manually operated front and rear door ramps.
- Open and Closed side emergency exits.
- Front and Rear door Emergency Release Lever located above doors.
- Reversing “Echo” blind spot detection system and backup camera.
- Rear door exterior warning lights.
- Rear and Open side door kneeling warning lights and buzzer.
- Interior security cameras.
- Electric remote control roof vent.
- Wheel-chair remote release belts.
- Q Straint “L” track mounted retractor QRT system.
- Customer call to Operator buttons.
- Anti microbial seat upholstery and stanchion protection.
- Interior LED lights.
- First aid kit, Mini first aid kit, safety reflectors.

VEHICLE EXTERIOR



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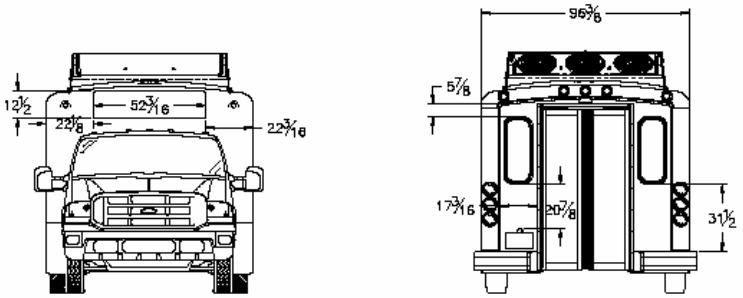
LET.	REVISION DESCRIPTION	BY	DATE
		BY	DRAWN
		DATE	8/8/08

STARTRANS TRANSIT BUS DIVISION CORNWALL, ON CANADA

MODEL:	S2 LOW FLOOR
DWG SCALE:	3/8" = 1'
PLOT SCALE:	1" = 48"
TITLE (OR COMMENTS):	TTC TRANSIT R/S ELEVATION
SERIES:	SENATOR II – LOW FLOOR
PART NUMBER:	
FILE LOC & FILE NUMBER:	S2 LF ELEVATION\TTC C



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LET.	REVISION DESCRIPTION	BY	DATE
		BY	DRAWN
		DATE	8/8/08

STARTRANS TRANSIT BUS DIVISION CORNWALL, ON CANADA

MODEL:	S2 LOW FLOOR
DWG SCALE:	3/8" = 1'
PLOT SCALE:	1" = 48"
TITLE (OR COMMENTS):	FRONT & REAR ELEVATIONS TTC TRANSIT
SERIES:	SENATOR II – LOW FLOOR
PART NUMBER:	
FILE LOC & FILE NUMBER:	S2 LF ELEVATION\TTC D

Note: These operating procedures are prepared based on the Friendly Bus Operators and Maintenance Manuals, June, 2009. The lights and their functions are listed, reading the panel from left to right.

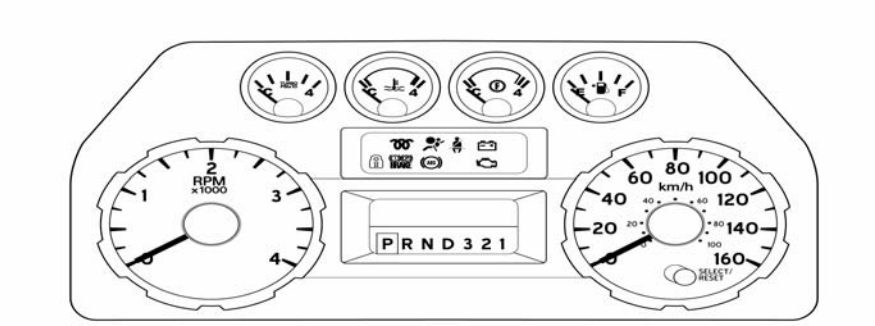
Starting the vehicle:

Starting this vehicle <u>properly</u> is an important part of the daily operation. The following procedure is required to prevent excessive engine wear.

From the driver's seat:

- Ensure all headlights and accessories are "OFF"
- Gear selector is in "PARK".
- Turn ignition key to "ON" position
- Amber "GLOW PLUG COIL" will illuminate. Wait for light to extinguish.
- Turn the ignition key to the "START" position. Do not exceed 15-second cycles.

DASH INSTRUMENTATION PANEL



Tell - Tale Lighting:

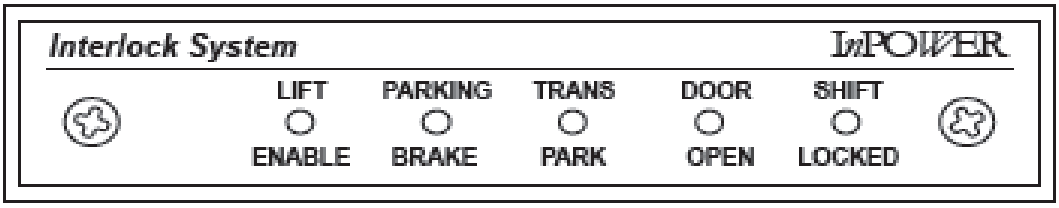
Observe dash area, all telltale lights should extinguish shortly after the engine starts, except the "Brake" light.

1. <u>Oil pressure / Engine coolant Lights:</u>
   Will illuminate when the coolant temperature is high or the oil pressure is low.
2. <u>Air Bag Readiness:</u>
   Illuminates momentarily when vehicle starts up, if it stays flashing, inform Dispatch.
3. <u>Charging System:</u>
   Continuously illuminates when battery is not charging.
4. <u>Brake System Warning:</u>
   Continuously illuminates when Parking Brake is applied or air pressure is below 80 psi. Vehicle is not to be moved while illuminated.
5. <u>High Beam:</u>
   Illuminates when High Beam headlights are on.
6. <u>Turn Indicator:</u>
   Illuminates when left/right turn indicator is selected.

7. Safety Belt:
   Illuminates to remind operator to put seat belt on.
8. Service Engine Soon:
   If continuously illuminated, contact Dispatch.
9. Water in the fuel:
   The vehicle has a fuel/filter water separator. When there is sufficient water in the filter this will illuminate and stay on.
10. Glow Plug Coil symbol:
    Illuminates when ignition is engaged. The engine is equipped with a GLOW PLUG engine starting aid, which is connected into the ignition system. When the key is turned the dash glow light will come when required and as the light is goes out the engine may be started.
    Do not attempt to engage starter until light extinguishes otherwise serious damage could result.

11. Anti-lock Brake System (ABS):
    Momentarily illuminates when the ignition is turned to the ON position to ensure the circuit is functional. If the light remains illuminated, continues to flash or fails to illuminate, contact Dispatch and advise.

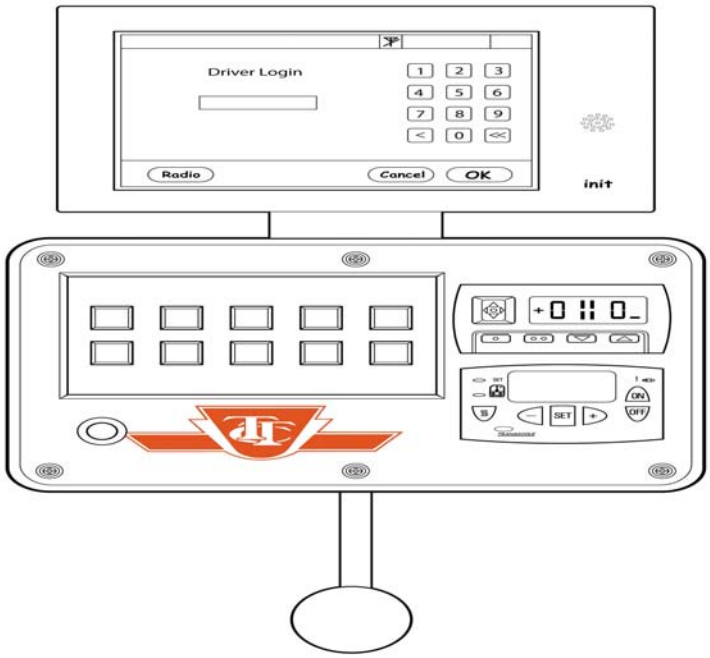
INTERLOCK SYSTEM



Interlock system:

1. Lift Enable:
   Light will illuminate when vehicle doors are opened and parking brake applied.
2. Parking Brake:
   Light will illuminate when vehicle is placed is placed in park with the parking brake applied.
3. Trans Park:
   Light will illuminate when shifter is placed in park.
4. Door Open:
   Light will illuminate when passenger door is open. Parking brake does not have to be applied.
5. Shift Locked:
   Illuminates when passenger door are opened. Parking brake does not have to be applied.

AUXILARY CONTROL PANEL



Multiplex unit:

This panel is located to the right of the driver's location and contains a series of auxiliary controls for vehicle operation.
The controls and their functions are listed as they appear, reading the panel from left to right, top to bottom.

1. Front Door Open Switch:
   Continue to depress button until the door is fully open or closed.

2. Front Heater:
   Push switch for desired heater fan speed (Low/High/Off).
3. Mid Heater:
   Push switch for desired heater fan speed (Low/High/Off).

4. Rear Heater:
   Push switch for desired heater fan speed (Low/High/Off).
5. Kneeling ON/OFF switch:

6. Rear Door OPEN/CLS:
   Must be switched to the "On" position to operate rear door or rear kneeling switches. Switch must be in the "OFF" position when not in use. Do not drive the vehicle with the switch in the "ON" position.

7. Front Strip Lights:
   Controls Front Cabin interior lights

8. Rear Strip Lights:
   Controls Rear Cabin Roof and Floor interior lights

9. Power Vent OPEN/CLS:

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Functions the vent portion of the hatch open and closed.

10. Cleaning Lights: Service Lights Control:
    Operates the interior lights without the ignition on

11. Amber Customer call button:
    Illuminates when Customer activates cabin control.

12. "Air Lift" Display Unit:
    Indicates the kneeling feature which has been selected.

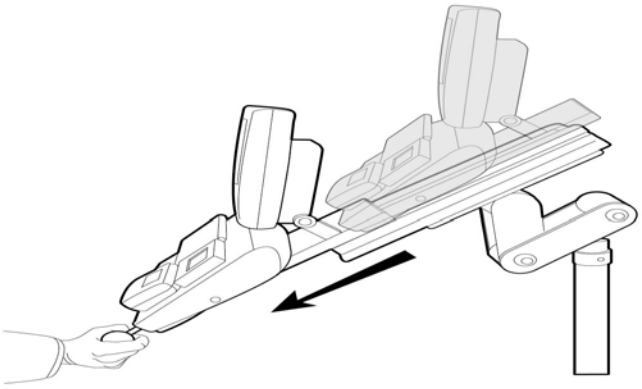
13. Passenger Compartment Air Conditioner control module:
    Reads and sets temperature for the passenger compartment area.

MULTI PLEX PANEL ADJUSTOR

The multi plex panel adjustor allows the panel move for the Operators comfort. To move the adjustor:

1. Grasp the adjustor handle.
2. Push down
3. Slide the panel up or down.

In the ideal position the Operator should be able to place their hand on the panel without reaching or bending their elbow.



FORD VEHICLE DASH PANEL CONTROLS

Ford Vehicle Dash mounted Auxiliary Panel Controls:

This panel is located to the front of the driver's location and contains a series of auxiliary controls for vehicle operation.
The controls and their functions are listed as they appear, reading the panel from left to right, top to bottom.

1. Headlight control dial:
   3 position switch, Off/ Parking/ On. Dial must be placed in the "Off "position when the vehicle is not in use, in the "P" position to function the exterior clearance lights when servicing Customers and in the "On" position for full headlight function.

2. Dimmer switch:
   The dimmer switch controls the lighting on the Ford instrument panel and the Operator cabin overhead light. Roll dial to illuminate instrument panel high to low dimmer, roll up fully for overhead lights.

3. Dash Mounted Cabin Environmental Control Switch (Heat or A/C):
   3 position switch, top for heat, middle for system Off, Bottom for A/C

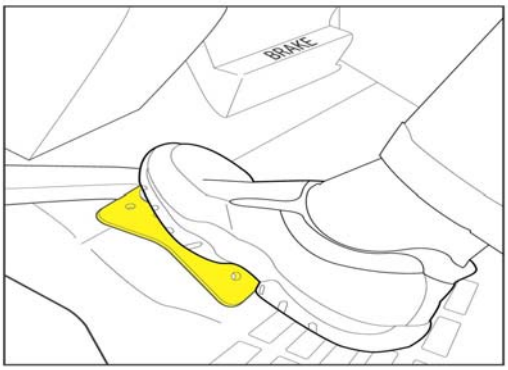
4. Cabin A/C & Heat Fan Control Switch:
   Rotate switch for desired A/C fan speed. The A/C fan will also supply heat when the heater switch is activated on the auxiliary panel

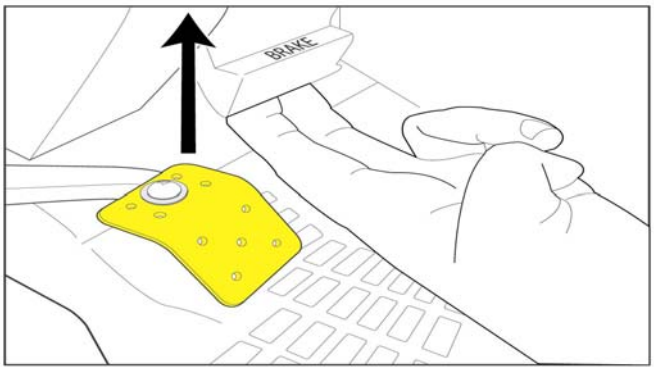
Emergency Parking Brake Foot Lever:

The Yellow Foot Pedal Parking/Emergency Brake lever is operated by pushing to apply and pulling the dash mounted lever to release.

Note: When picking-up or dropping-ff at locations with an incline, uphill or downhill procedures for incline parking must be followed and the Parking/Emergency (foot) Brake lever must be applied.

Note: The shifter will not come out of the park position with the Parking Brake applied.





Gear Shifter override bypass:

The gear sifter has an override system that is located to the left of the steering column. If the shifter is locked into position, using the following procedures:

1. Turn the key to the accessory position.
2. Turn the override switch to the left.
3. Function shifter.

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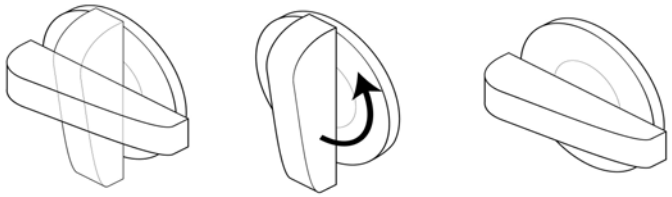

Note: Should the fail to disengage the gear shifter, contact Dispatch and advise.

Emergency Silent Alarm System: Under development - future feature

Boom Mike system: Under development - future feature

AVL - Automatic Vehicle locater (GPS) and Reverse Assist Camera: Under development - future feature

Echovision Reversing assist system:

Echovision is a blind spot obstacle detection system that sends out ultrasonic pulses and listens for their return. The system will automatically turn on when you place the vehicle into reverse and will give a short series of high and low bursts to test the audible warning components. When obstacles are within approximately 10 feet to the rear of the vehicle, an interrupted-tone alarm is sounded. The pulse rate of this alarm increases as the distance between the sensors and the object decreases. When the obstacle is within three feet, a constant high pitched tone is given.

The system will not pick-up anything outside of the ten foot range, objects that cannot reflect sound waves back to the receiver such as smooth surfaces. False alarms may occur periodically if you are backing down an incline, driving on rough uneven surfaces or driving in heavy precipitation.

There are two indicators on the system labeled “Ready” and “Fault”. “Ready” means that the system is functioning normally. “Fault” indicates that the system has a malfunction, contact Dispatch and advise.

Kneeling Feature:

Front door:

The Kneeling feature is controlled by an “Air Lift” control located on the multiplex panel, and a toggle switch panel at each passenger door area. To properly operate the kneeling feature complete the following steps.

1. Secure the vehicle
2. Vehicle must be in the Park position.

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3. Select the “Front Kneel” function on the airlift panel.
4. Proceed to the open side of the vehicle and kneel the bus by placing the toggle switch (the toggle switches are located to the right of the doors) in the kneel position.
5. To raise the vehicle return the Kneeling switch to the “NORMAL” position and the vehicle will rise on its own.

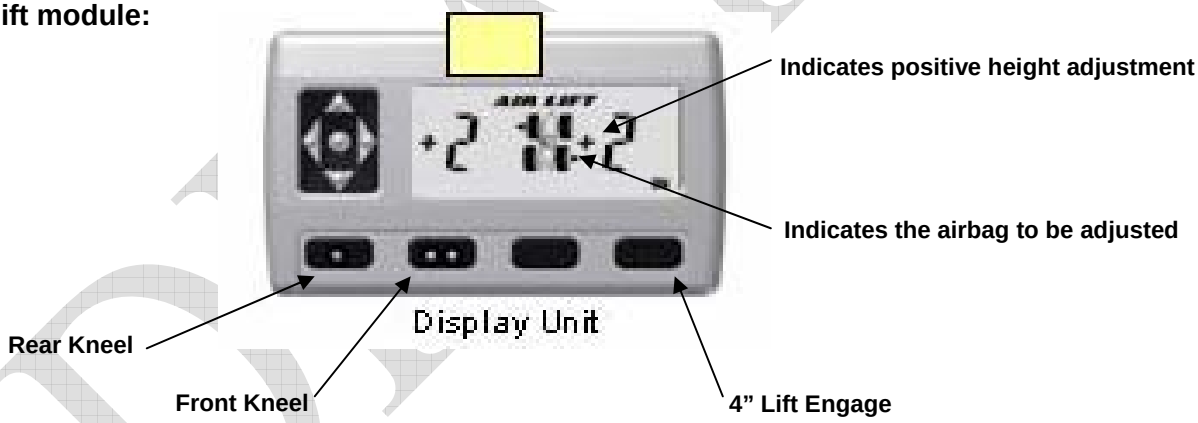
Rear door:

1. Secure the vehicle
2. Vehicle must be in Park and the Rear Door authorization switch in the ON position.
3. Select the “Rear Kneel” function on the airlift panel.
4. Proceed to the rear of the vehicle and kneel the bus by placing the toggle switch (the toggle switches are located to the right of the doors) in the kneel position.
5. To raise the vehicle return the Kneeling switch to the “NORMAL” position and the vehicle will rise on its own.

Caution: Wait until vehicle is in the fully raised position prior to moving the vehicle.

Warning: Always kneel the vehicle before opening passenger doors. Failure to do so may result in equipment damage.

Air lift module:



The Airlift text on top of the display will remain lit at all times along with the four tires and with an arrow in the middle. The four tires simulate the tires on the vehicle and will be referenced to notify the user of which airbag is going to be adjusted.

The small triangle pointing sideways next to the two rear tires indicate which tire is currently selected to be modified.
The little antenna with radio wave symbols that flash every second on the bottom of the display indicates that the display is communicating to the manifold.

An arrow in the middle of the left two wheels pointing to the left indicates that the system is exhausting air from the air bags. The arrow will disappear one the manifold is done exhausting to the preset pressure/height.

The “+” sign to the left of the numbers indicates positive height adjustment from default “0” setting. The “+” will turn to the “-“when the system is below the default “0” setting. The rear air bags have 4 inches both positive and negative adjustment per side.

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The "_" (underscore) symbol to the right of each number notifies which air bag(s) will be knelt when the parking brake is applied.

Air Suspension Failure

If the vehicle suspension does not rise to the normal operating position, the vehicle must not be moved. The following procedure must be followed:

1. Notify Dispatch
2. Accommodate passengers on change off vehicle
3. Standby for a change off

Front Door and Ramp Operation:

The Friendly vehicle has a wider rear axle than the front axle. Pulling into the curb using the front axle as a guide will result in the rear of the vehicle contacting the curb and any object in close proximity. Always leave 10 to 15 cm. (4 to 6) inches between the vehicle and the curb.

Prior to operating any Door or Ramp, the vehicle transmission must be in the Park position.

Note: Operators must exit the driver's seat using the driver's side door.

Warning: Operators are required to report any time curb contact has been made, no matter how minor it may seem.

Front Door:

The operation of the open side door is controlled from the auxiliary panel or the toggle switch outside the vehicle.

1. Bring vehicle to full stop at desired location.
2. Place Transmission into Park.
3. Turn the vehicle off and into the "Accessory" position.
4. Turn headlights to the park position.
5. Activate the front door kneeling feature on the airlift module.
6. Exit the vehicle via the Driver's door and kneel the bus using the toggle switches located to the right side of the doors.
7. Once the vehicle has completed the kneeling function, open doors.

Note: Always open the front doors prior to kneeling the vehicle, failure to do so may result in equipment damage.

Front Ramp Operation:

Ensure the vehicle is secured properly. The ramp must only be operated while standing outside the vehicle.

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To Deploy:

1. Follow steps 1 to 7 for Front Door operation.
2. Ensure the area is clear of passengers.
3. Grasp Ramp handle located to the right of the ramp platform with your right hand.
4. Maintain a secure 3-point stance.
5. Pull gently on the handle, take hold of ramp with your left hand when it is within range and walk the ramp outward. When the ramp is nearly extended take your left hand off the ramp and gently lower the platform to ground level.
6. Secure the ramp handle in the door tether.

To Stow:

1. Ensure ramp platform and area is clear.
2. Release ramp handle from door bracket.
3. Pull gently lifting the ramp up, take hold of ramp with your left hand when it is within range and walk the ramp forward. When the ramp is at the halfway point, take your left hand off the ramp and gently lower the platform into the recessed floor groves.
4. Secure ramp handle in locking bracket.

Rear Door and Ramp Operation:

Prior to operating any Door or Ramp, the vehicle transmission must be in the Park position.

Kneel the vehicle before opening passenger doors. Failure to do so may result in equipment damage. The Operator must always be at the rear of the vehicle when raising or lowering the vehicle. The vehicle must be fully raised before the Rear Door Power Switch is turned off.

Rear Door:

The Rear Door is controlled by the Operator, from the outside of the vehicle. The vehicle must be in the “Accessory” position and the rear door switch authorized on the multiplex panel.

1. Bring vehicle to full stop at desired location.
2. Place Transmission into Park.
3. Turn the vehicle off and into the “Accessory” position.
4. Turn headlights to the park position.
5. Authorize the rear door on the multiplex panel.
6. Activate the rear door kneeling feature on the airlift module.
7. Exit the vehicle via the Driver’s door and kneel the bus using the toggle switches located to the right side of the doors.
8. Once the vehicle has completed the kneeling function, open doors.

Note: Always open the front doors prior to kneeling the vehicle, failure to do so may result in equipment damage.

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Note: An audible beeper will sound for approximately 15 seconds when the kneeling toggle is activated. An amber light will also illuminate and flash until the kneeling feature has been returned to the "Off" position.

Note: The rear door power switch must be switched to the **OFF** position when not in use. Do not drive with this switch in the **ON** position.

Rear Ramp Operation:

To Deploy:

1. Follow steps 1 to 7 for Front Door operation.
2. Ensure the area is clear of passengers.
3. Grasp Ramp handle located to the right of the ramp platform with your right hand.
4. Maintain a secure 3-point stance.
5. Pull gently on the handle, take hold of ramp with your left hand when it is within range and walk the ramp outward. When the ramp is nearly extended take your left hand off the ramp and gently lower the platform to ground level.
6. Secure the ramp handle in the door tether.

To Retract and Stow:

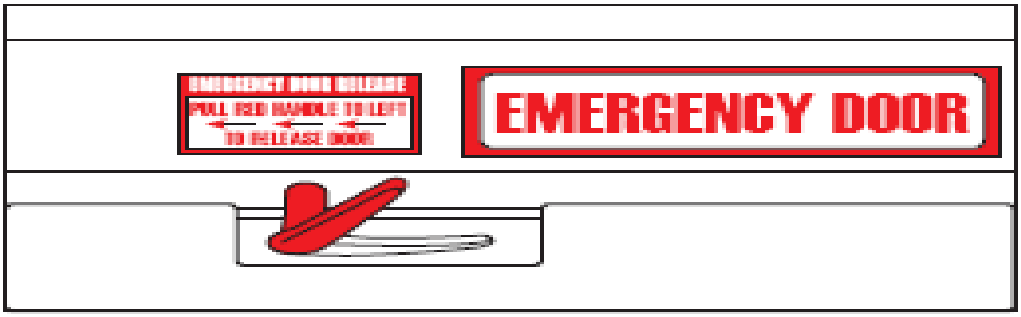
1. Ensure ramp platform and area is clear.
2. Release ramp handle from door bracket.
3. Pull gently lifting the ramp up, take hold of ramp with your left hand when it is within range and walk the ramp forward. When the ramp is at the halfway point, take your left hand off the ramp and gently lower the platform into the recessed floor groves.
4. Secure ramp handle in locking bracket.

Interior Front and Rear Doors Manual Release Functions:

The Front and Rear Doors may be opened manually in the event of an Emergency. The Red Manual Override handle is located on the left hand side above each door. The doors can be opened by using the following procedure.

Interior release:

1. Grasp the Red Emergency exit handle above the door
2. Turn the handle Left to release the door.
3. Push the door open by hand.



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To Restore Door Operation

1. Return the release handle to horizontal position to reset the Doors.
2. Recycle once after being reset.

Exterior Front and Rear Doors Manual Release Functions:

To release the front and rear doors from the outside:

1. Pull down on the RED release ring, located in the upper left corner of the door.
2. Pull the door open.

To Restore Door Operation

1. Enter into the passenger compartment of the vehicle.
2. Turn the release handle back to the horizontal to reset the Doors.
3. The Doors must be cycled once after being reset.

Note: If the doors are not closed properly the transmission will not shift out of the PARK position. If the doors open while in motion, the door light indicator on the System Interlock panel and an audible alert will sound. Operator should ensure doors are fully closed prior to moving off.

Emergency Rear Kneeling Dump Valve:

The Emergency Rear Kneeling Dump Valve is located on the black box in the Operator's area. Operators are to utilize this function when directed to do so by Supervisor personnel or under emergency situations only. To function this system Operator's must:

1. Grasp the horizontal lever
2. Pull lever down to the vertical position

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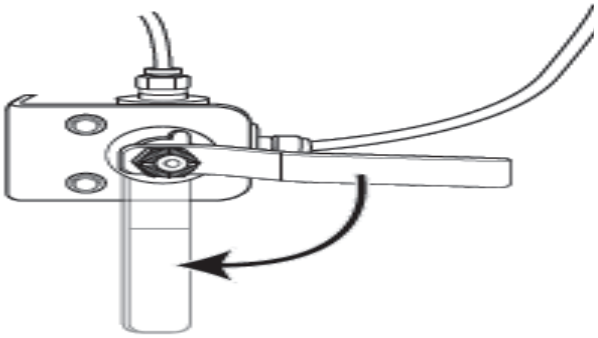


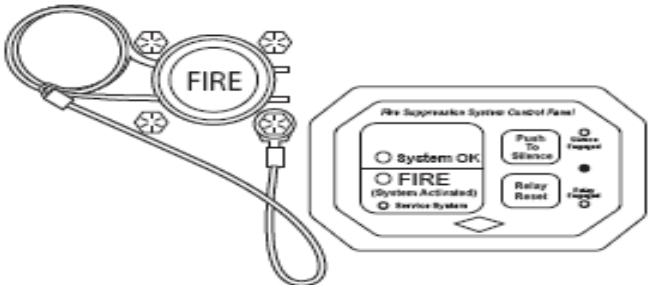
Electric Emergency Roof Hatch:

The emergency roof hatch is controlled by the switch on the multiplex panel. Should the battery power fail, the roof hatch can be operated manually by:

1. Turning the lever from the latched position to the exit position.
2. Push knob to open.

Fire Suppression System:

The Friendly bus is equipped with an Amerex Automatic Fire Suppression System, which consists of a 25lb. fire extinguisher and three nozzle spray heads. This system is automatically controlled to release the extinguishing agent if the temperature reaches the specified preset temperature. Operators must ensure that a thorough inspection of the systems components is completed prior to entering service. The Standard Operating Procedures for the Amerex system are located in the Operator's manual, Emergency Procedures Section # 9, pg. 6.



Emergency Battery cut off switch:

The Emergency Battery cut off switch is located on the black box in the Operator's area. Operators are to utilize this function when directed to do so by Supervisor personnel or under emergency situations only. To function this system Operator's must:

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1. Grasp the switch
2. Turn switch right to the off position

Emergency Four Wheel Lock:

If the vehicle experiences a drive line failure it can be brought to a stop using the normal foot braking system and then held in place with the 4 wheel lock emergency brake system.

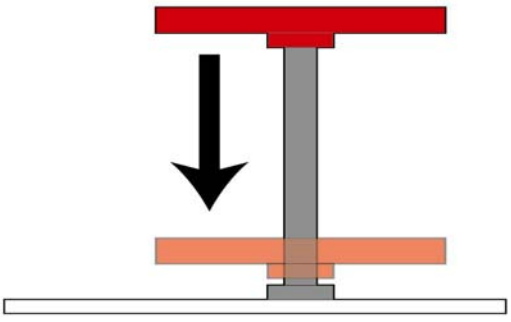
The four wheel lock mechanism is to be utilized only when the vehicle experiences a driveline failure. To apply the wheel locks the following procedures must be followed:

To Engage:

1. Ensure the gear selector is in the "Park" position.
2. Apply the Emergency Parking Brake Foot Lever.
3. Pull the wheel lock plunger up, an alarm will sound.
4. Press on your parking brake until the alarm silences.

To Disengage:

1. Place foot on parking brake.
2. Push the wheel lock plunger back to the original position.



Passenger Compartment Camera System:

The hard drive for the camera system is located in the Operators cabin compartment on top of the black battery box. Operators must ensure that the green light is illuminated prior to taking the vehicle into service and continually check to ensure the light stays illuminated throughout the duration of the shift. A red light is showing on the panel means the system has detected an abnormality and has automatically started a self diagnostic check. In this circumstance the vehicle may remain in service and signed in

at the end of the shift. If there are no lights or two red lights showing, contact Dispatch and advise.

Water on the Roadway:

Operators are reminded to use **Caution** while driving through puddles that have formed on the roadway by slowing your vehicle to a safe speed to avoid excess water being spayed onto the windshield.

Operators must be in control of their vehicle at all times, and be aware of all road hazards that can affect the handling of their vehicle.

Convex Mirror (front openside fender):

The front mirrors are located on the front fenders and are pre-adjusted to allow the driver to see the front of the vehicle as well as down the side.

Hydraulic Brakes:

Hydraulic brake systems are filled with brake fluid that cannot be compressed. When pressure is put on the brake fluid at one location it is felt throughout the brake system. This system provides an immediate and direct response at each wheel to the action of pressing on the brake pedal.

The fluid that is in a hydraulic brake system cannot be compressed and the system is always full of fluid.

The hydraulic brake system includes a hydraulic pressurized Booster and Master Cylinder assembly very similar to your personal vehicle.

Using ABS

- In an emergency or when maximum efficiency from the ABS is required, apply continuous force on the brake. The ABS will be activated immediately, thus allowing you to retain full steering control of your vehicle and, providing there is sufficient space, will enable you to avoid obstacles and bring the vehicle to a controlled stop.

- The anti-lock system does not decrease the time necessary to apply the brakes or always reduce stopping distance. Always leave enough room between your vehicle and the vehicle in front of you to stop.
- We recommend that you familiarize yourself with this braking technique. However, avoid taking any unnecessary risks.

Note: With the ABS light illuminated, the anti-lock brake system is disabled and normal braking is still effective unless the brake warning light also remains illuminated with the parking brake released. If your brake warning lamp illuminates, the vehicle is not to be moved and Dispatch must be advised.

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Commission Policy and the Law require a thorough pre-trip inspection each day before the vehicle leaves the property. It is recommended that you perform the pre-trip inspection the same way each time so you will be sure to notice when irregularities appear.

Note: During the pre-trip inspection, the operator is required to constantly listen for audible air leaks from all areas of the vehicle.

Operators are encouraged to complete as much of their circle check as possible with the engine in the off position. If a large amount of exhaust fumes are being emitted from the vehicle, Operators must take the vehicle out of the barn to complete the circle check.

Enter Vehicle:

Warning: Be aware of uneven pavement or slippery surfaces when entering or exiting your vehicle, and always ensure your footing is secure at all times. Wear the proper safety footwear and ensure it's in good condition. Ensure your path is clear before entering or exiting any door on your vehicle.

Entering the Drivers Area:

1. With the driver's door open, place your left hand onto the door armrest and your right hand onto the grab bar located on the door frame. Place your right foot up onto the side step. (3-point stance).

2. Using the door arm rest and steering wheel as support raise yourself up until both feet are securely placed on the side step.

3. With both feet firmly secured, step into the vehicle with your right foot and sit on the driver's seat.

Turn on vehicle exterior lights, using dash control, including four way flashers, using column control.

Exit the bus and inspect the vehicle in the following manner:

Exiting the Drivers Area:

1. With the driver's door open, place your left hand on the door armrest for support.

2. Turn and place your left foot securely out onto the side step and your right hand on the grab bar.

3. Place your right foot onto the side step.

4. Look at the ground below you for hazards prior to stepping to the ground.

5. While continuing to use the armrest and grab bar for support, step down with one foot at a time to ensure you have safe secure footing.

Front of Vehicle:

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Use the “High Low” method of inspection, working from the top of the vehicle to the bottom.

- Safety Validation Sticker — punched out with proper date and designation
- Battery compartment — closed and secured
- Lights — proper operation
- Windshield — clean, no cracks
- Exterior mirrors — clean & secure
- Windshield wipers — good condition, proper tension
- Hazard lights — proper operation
- License plate — secure with proper validation sticker
- Bumper — secure
- Exterior body — inspect for visible damage, loose or missing pieces, fluid and air leaks
- Hatches, doors, windows — closed and secured
- Compartments — closed and secured

Sides of Vehicle:

- Mud guards and flaps — clean, secure, no cracks or damage
- Doors and windows — closed and secure no breaks or cracks, exterior/ interior emergency door release
- Clearance lights — proper operation
- Vehicle exterior — clean, no visible damage
- Wheels and tires — proper inflation & tread, no visible cuts, bulges,
- Wheel and hub lugs — in place, secure and no damage
- Exhaust system — listen for audible air leaks, secured
- Main door — operates properly
- Ramp — cycle to ensure proper Operation, ramp
- Fuel compartment — cap closed properly, rear kneel dump valve in horizontal (closed) position

Rear of Vehicle:

- Clearance lights — proper illumination
- Rear window/ramp/door — secured, no breaks or cracks, cycle ramp, ramp fastener connects to ramp exterior/interior emergency door release function
- Tail/brake/signal /license plate lights — all lights proper illumination and operation

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• License plate	clean secure and valid
• Bumper	secure
• Vehicle exterior	clean, no visible body damage
• Doors and windows	secure, no breaks or cracks
• Railway Crossings Signage	clean and visible

Enter Vehicle:

Inspect the following from inside the vehicle:

• Fire axe	present and secured
• Fire Extinguishers (2)	properly tagged, charged and secured
• Belt Cutters (3)	present, tagged, damaged
• Reflector kit	check contents and secured
• First Aid kit	check seal
• Vehicle paperwork	ownership, Insurance, C.V.O.R., Safety Validation
• Cabin seats	secure, no damage, seat belts
• Poles and stanchions	secure, no damage
• Emergency exits (windows 2) doors (2), Roof Hatch	secure, no damage or leaks, manual release functions
• General interior condition	no visible signs of damage
• Securement belts	complete set of belts (10 clamping, 6 tensions and 4 two piece seat belt assemblies)
• Floor Track	floor track clean and clear

Driver's Compartment:

• Start engine	refer to Start Engine Procedure
• Main gauges	functioning
• Cycle rear kneeling	correct operation of panel controls
• Air pressure gauge	builds to and maintains pressure
• Windshield wipers and washers	column control functioning Correctly/ wash emitting
• Heaters and defrosters	Point vents away from Operator seat position cycle vent controls
• Turn indicators	cycle controls
• Interior mirrors	clean, clear not cracked
• Interior lighting	illuminated properly
• Auxiliary Control Panel	cycle all functions
• Fire Suppression System	extinguisher fully charged, green light on both fire control panels illuminated
• Engine Compartment Temperature Monitoring System	green light indicator illuminated

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• Cabin	check for fumes, noises and Vibrations
• Horn	audible
• Cabin Compartment camera system illuminated	green light indicator
• Battery Shut Off Rod	In the “On” position

Brake Checks:

The braking system equipped on this vehicle is a hydraulic service brake with ABS assist accompanied by a manual emergency/park brake and 4 wheel lock system. The brake tests to be completed during a pre-trip inspection are as follows:

While in the driver’s seat:

Ensures transmission is in “PARK” position. Keep the brake pedal covered for duration of brake test.

Step #1: **Hydraulic Brake Functionality Test**.

1. With the engine turned on, apply the manual Yellow Brake pedal to ensure that the foot travel is normal.

Step #2: **Manual Foot Emergency Brake Test.**

With the (Yellow) manual foot brake pedal applied:

1. Place the transmission in “D” Drive.
2. Apply light throttle to ensure the parking brake is holding.
3. Place the transmission back into Park.

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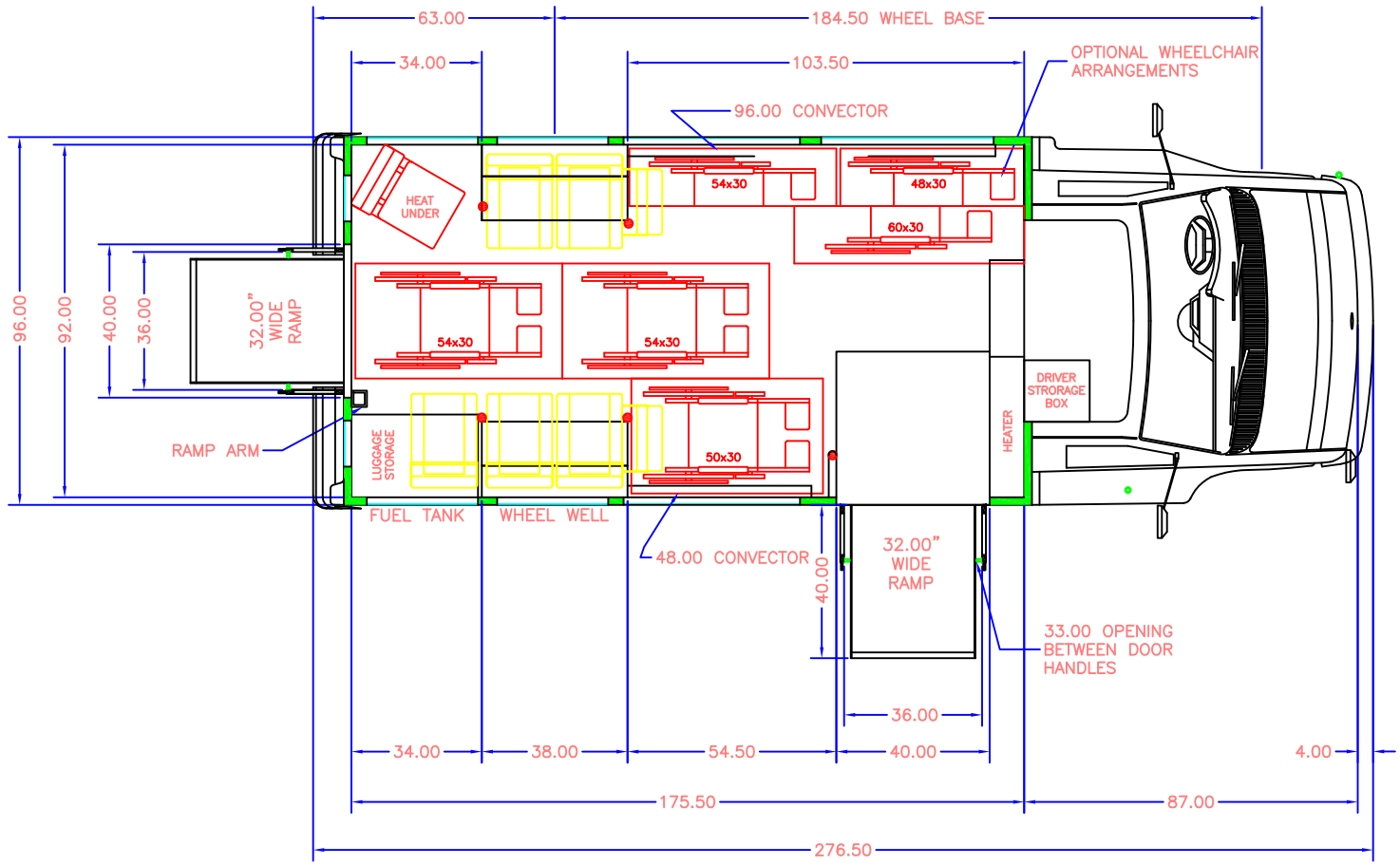

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SCALE AS SHOWN
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OVERLAND CUSTOM COACH

Innovators in Accessible Transportation

NAME	SEAT LAYOUT – T.T.C.
DESC	ELF MODEL 122 STANDARD COMBINED 8 SEATS AND 5 WHEELCHAIRS
DATE	FEB 23,1999
PAGE	1 OF 1
DWG	122–X
REV	F

ELF Heavy Duty

Ford ELF bus

In 1999, Wheel-Trans began phasing out its fleet of aging Orion II vehicles and replacing them with the new ELF buses. By December 1999, 23 of the new vehicles were in service; 74 were in service by June 2000; and 104 were in service by April 2001. The remaining 23 are expected to arrive in the first quarter of 2002 for a total of 127.

Most of the Orion II buses will be retired by March 2002, with the exception of six vehicles, which will be used for the Community Bus service. These will be phased out by 2005.

Principal specifications:

Type – ELF (Overland Custom Coach)
Seats – 5 wheelchairs, 8 ambulatory seats
Length – 23' 4"
Width – 96"
Height – 108"
Weight – 16,000 lbs.

OVERLAND CUSTOM COACH INC.

Innovators in Accessible Transportation

SERVICE MANUAL

Overland Custom Coach Inc.
R.R.#2, 21051 Nissouri Road
Thorndale, ON N0M 2P0
Ph.(519)461-1140 Fax (519)461-0523

Section 12

WHEELS, TOWING & JACKING

Overland Custom Coach Inc.
RR #2, 21051 Nissouri Road
Thorndale, Ontario, NOM 2P0
Ph (519)461-1140 Fax (519)461-0523

WHEELS, TOWING & JACKING

DESCRIPTION

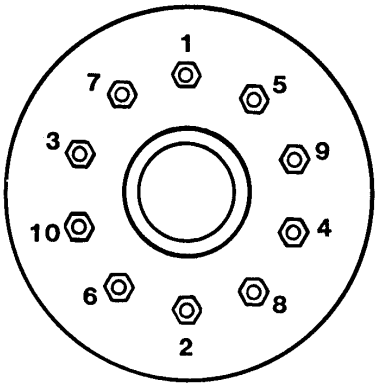
Wheels supplied currently on The ELF family of vehicles are of the 19.5" hub pilot, flange nut design. Standard wheels are 19.5" x 245 on the front and either 19.5" x 245 or 19.5" x 265 on the rear, depending on GVW option.

MAINTENANCE

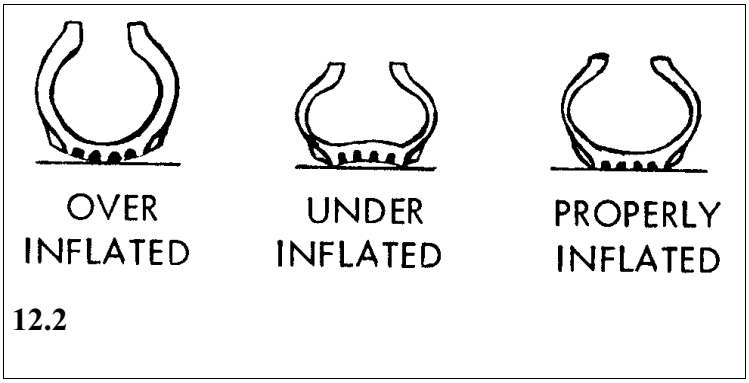
Maintenance consists of periodic checks to ensure that wheel nuts are tightened to proper torque. Any time the wheels have been removed the wheels should be re-torqued after the first 100 miles of service. Tighten wheel nuts progressively on alternate sides of the wheel (Fig 12.1) with final tightening performed using a torque wrench set to 450-500 ft-lbs. Wheel nuts should be kept free from grease and oil. No lubricant should be used.

Wheel assemblies should be inspected daily for cuts or foreign matter such as nails, screws etc. Tire inflation should be noted visually (Fig 12.2) and pressures should be regularly checked using an accurate tire pressure gauge and adjusted to tire manufacturer's specifications.

NOTE: Tire pressure should be checked with tire cold.



12.1



12.2

WHEEL ASSEMBLY REMOVAL

WARNING: DO NOT USE HEAT TO LOOSEN A SEIZED WHEEL NUT. HEAT CAN DAMAGE THE WHEEL AND WHEEL BEARINGS.

1. Remove wheel cover, if so equipped.
2. With the weight of the vehicle still on the tires, loosen the wheel nuts. **DO NOT** remove the wheel nuts at this time.
3. Raise the vehicle until the wheel and tire assembly clears the floor enough to allow the assembly to be removed from the wheel hub.
4. Remove all the wheel nuts.
5. Remove the wheel and tire assembly.

WHEEL ASSEMBLY INSTALLATION

WARNING: When a wheel is installed, always remove any corrosion, dirt or foreign material present on the mounting surfaces of the wheel or hub surfaces that contact the wheel. Improper wheel installation can cause wheel nuts to loosen and the wheel coming off while the vehicle is in motion, resulting in loss of control.

1. Position the wheel and tire assembly on the vehicle.
2. Install the wheel nuts loosely.
3. Turn the wheel until one wheel nut is at the top of the wheel hub bolt circle. Tighten the wheel nut until snug. In a crisscross-type pattern (Fig 12.1), tighten the remaining nuts until snug.
4. Lower the vehicle.
5. Tighten the wheel nuts to recommended torque specification.
6. Install wheel cover, if equipped.

TOWING

The vehicle can be towed from the front if it has been equipped with tow hooks and from the rear only if the vehicle is equipped with the optional rear tow eyes.

If towing from the rear, the front drive shaft must be removed.

In either case, when towing The ELF, the ignition key must be left in the accessory position to allow the air compressor to maintain air system pressure.

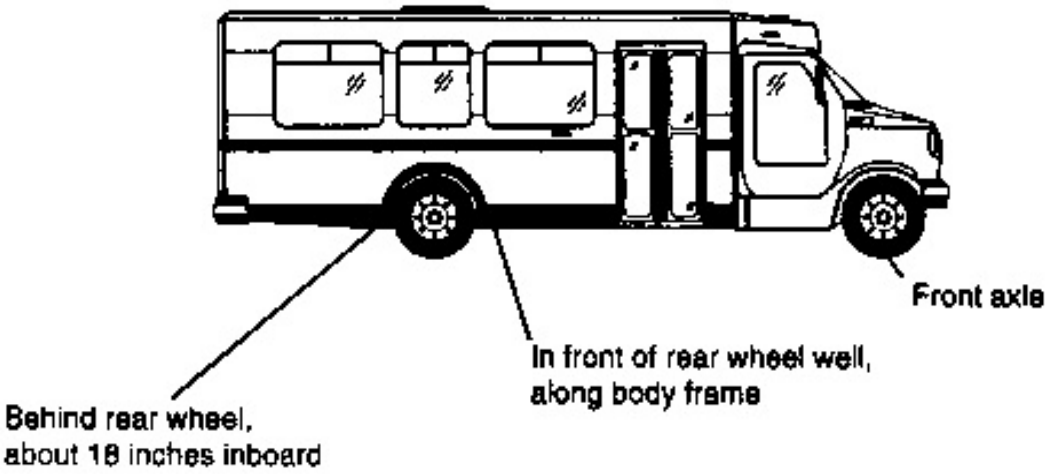
It may also be necessary to cage the rear emergency brake cylinders to prevent the rear brakes from engaging.

CAUTION:
DO NOT tow the vehicle from the bumpers.
Personal injury or equipment damage may result.

JACKING POSITION

Jacking points are shown in Fig 12.3. Always secure the vehicle with suitable jack stands.

NOTE: If necessary to support vehicle at rear cab frame area (ie. front axle removal), inspect top cab to body seam for separation and re-seal with Sikaflex as required.



12.3

LIFTING INSTRUCTIONS

To prevent possible damage to the underbody or components, do not drive the vehicle onto the hoist without first checking for possible interference. Adapters may be necessary for front and rear to lift the vehicle safely. The front pads of the hoist should contact the lifting pads provided on the front axle brackets right and left sides. The rear pads of the hoist should contact the rear axle tube assembly.

Alternate lifting points may be available. Contact manufacturer before attempting to lift or jack from any other points than those mention above.

TROUBLE SHOOTING AND PROBLEM DIAGNOSIS

Problems	Possible Causes	Recommended Repair

SPECIAL TOOLS

Manufacturer Tool Description	Manufacturer Tool Part Number

TECHNICAL FEATURES

Item	Specification
Front and rear tires (16,000 lb)	19.5x245
Rear tires (18,000 lb)	19.5x265

LUBRICANTS, SEALING COMPOUNDS & ADHESIVES

RECOMMENDED TORQUE SPECIFICATIONS

Description	Nm	Lb/In
Front and Rear Wheel Nuts	333	450

Nova Bus Articulate

SECTION 18-500.00
HOISTING AND TOWING

WARNING

1. All Federal, State, Provincial, Municipal and company, (including Transit Authority), laws and regulations regarding hoisting and towing vehicles must be complied with. Also, any additional safety equipment as specified by regulation of the above must be in place.

2. Improper use of towing and hoisting equipment can be dangerous. Incorrect operation can result in bodily injury to the operator, helpers and bystanders. Only authorized and trained personnel who completely understand the operation of such equipment should be permitted to operate towing and hoisting equipment unsupervised.

3. For towing operations, the operator must also be aware of the hazards of operating at a location where electric power lines, irregular ground contour, water, ice, mud, or other conditions, as well as fluids or damaged parts of a bus can interfere with ordinary safe operation.

4. The wearing of safety glasses, footwear and personal safety clothing is compulsory.

5. The towing vehicle must be equipped with sufficient means for supporting a load in its raised position while under tow. It must also be fitted with spacer bars, designed to minimize any damage that may be caused to the towed motor vehicle, as well as safety chains.

6. When a bus has been fully lifted by a tow truck, the bus must be adequately secured to the tow truck before it is moved.

7. ALWAYS use safety chains when towing.

8. Do not use towing and hoisting equipment except on a solid, level surface with stabilizers properly extended (if applicable) and truck brakes locked.

9. Operate all controls slowly and smoothly to avoid damage to the towing unit or injury to personnel.

10. Do not operate, stand or lie beneath a boom, spacer bar or a raised bus during a towing operation unless adequate safety blocks or supports are in place and the bus's parking brake is applied.

11. All appropriately authorized signs, signals and lights shall be activated and tow truck operators shall wear reflective traffic safety vests while performing recovery operations or when circumstances are such that the vehicle being transported creates a potentially hazardous condition for the safe movement or passage of other motorists.

12. Do not tow the vehicle at high speeds.

13. UNDER NO CIRCUMSTANCES should certain buses be towed without first having both the driven axle shafts disconnected. This precaution is essential in order to avoid damaging the transmission and other major drive train components. See the heading REMOVE THE TWO FLANGED DRIVEN SHAFTS in this document.

GENERAL DESCRIPTION

NOTE:

The information contained in this document applies to all models of the LFS vehicle, including the articulated bus (See Annex A), unless otherwise specifically mentioned.

There are several hoisting and towing points on the vehicle. Use **ONLY** these points for towing or hoisting.

Tow eyes, for front towing, are generally stored in the front compartment near the operator. They should be screwed into the holes at the front of the vehicle. See Figure 1. They are designed **ONLY** for towing the vehicle for very short distances while its wheels are on the ground. For example, towing within a Transit Authority's garage area or yard, or moving a bus on the road into a more convenient and safe position in order to hoist the bus for proper towing. ***Tow eyes must not be used as hoisting points,*** as this could cause damage to the vehicle.

See Figure 2 for the location of the towing and hoisting points.

Figure 1 - Tow Eyes

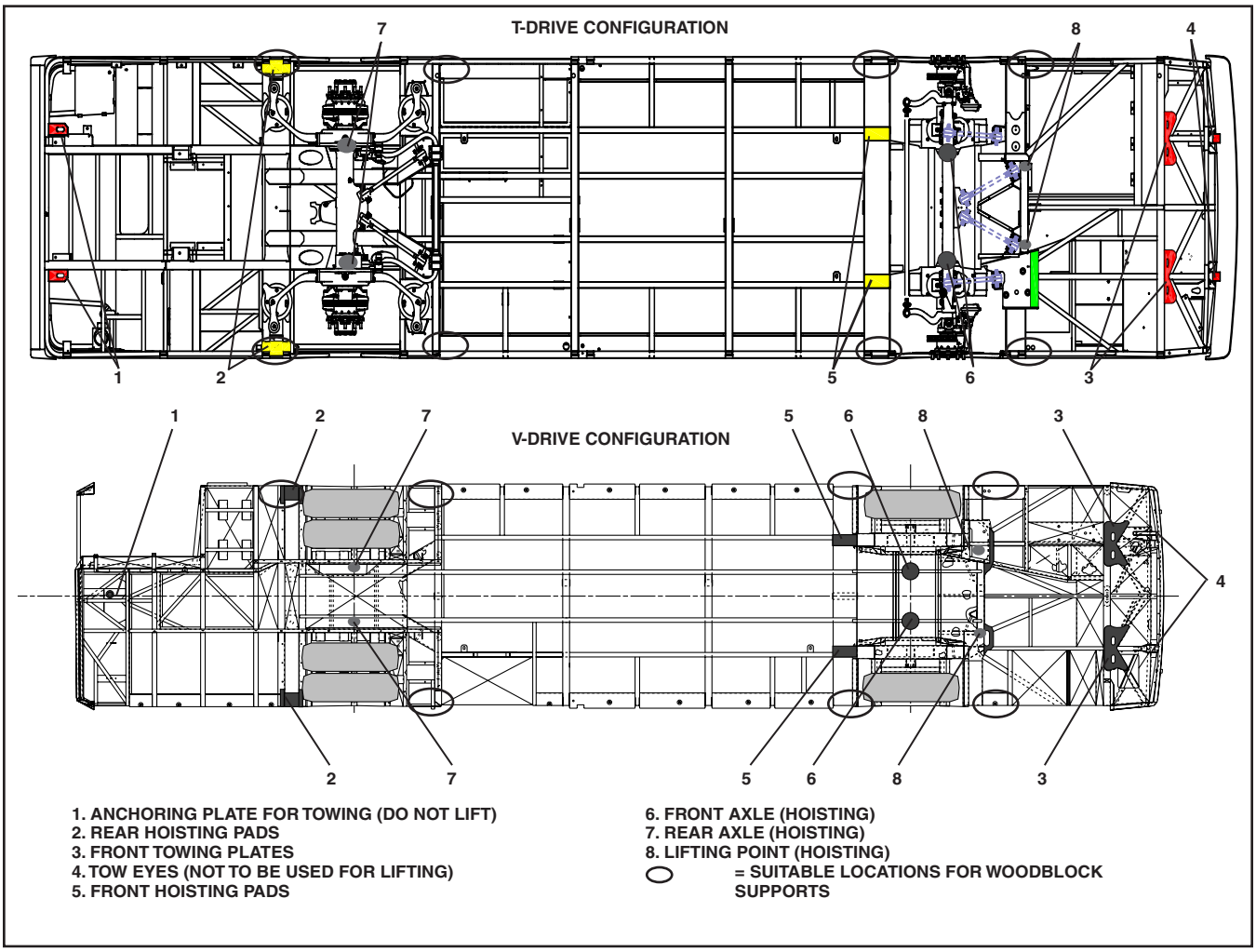


Figure 2 - Hoisting and Towing Points

TOWING THE VEHICLE

WARNING:

It is recommended to lift from the front in order to move an immobile bus. Nova Bus does not recommend, at any time, rear-end lifting of any of its vehicles. Any direct or indirect damage resulting from rear-end lifting is not guaranteed by the manufacturer.

Pulling an immobile bus from the rear, to remove from a roadside ditch, for example, is acceptable, as long as only the proper locations on the bus, as identified in Figure 2 (item 1), are used.

CAUTION:

While the bus is being towed, its pneumatic system must be supplied with a 690 kPa (100 psi) minimum pressure to maintain the brakes in the released position.

CAUTION:

Lift at the minimal height required for the bus to trail the towing vehicle.

PREPARING FOR TOWING

NOTE:

Set the emergency switch (Hazard) to the ON position. This is not necessary if a towing light bar is installed.

DISABLE THE INTERLOCKS

Disable the brake interlock **BEFORE** attempting to tow the vehicle.

1. If the front and rear brakes are blocked, turn off the **MASTER CONTROL SWITCH** or the **DOOR MASTER SWITCH** to override the interlocks.
2. If the brakes are still blocked, perform one of the following procedures to supply air to the system:
   a. Release the parking brake. See section 08: **BRAKING SYSTEM** for the procedure.
   b. Using the tow connector, fill the system with air.
3. If the brakes are still blocked, it will be necessary to **CAGE** the brake booster. **CAGING** involves compressing the spring inside the brake chamber using a caging tool, otherwise known as a T-Bolt. If the rear axle has drum brakes the T-bolt must be screwed in. If the rear axle has disk brakes, the T-bolt is located inside the brake booster and must be screwed out.

NOTE:

Caging is usually required only in those circumstances where there is a major problem in the primary circuit.

For the rear axle, verify that the parking brake is released.

If it is impossible to restore pressure to the pneumatic system, the vehicle **MUST** be towed on a flatbed trailer. In this case, release the parking brake and disconnect the brake chambers.

REMOVE THE TWO FLANGED DRIVEN SHAFTS (REAR WHEELS ONLY)

The following procedure must be applied **BEFORE** attempting to tow the vehicle.

1. Remove all of the bolts holding the hub cover to the axle and remove the cover. See Figure 3. Use a container to recover the oil.
2. Remove the drive shaft and place it inside the bus. See Figures 4 and 5.
3. Replace the cover with a temporary replacement cover.
4. Return the recovered oil to the hub to protect the bearings.
5. Repeat this procedure for the other hub/shaft assembly.

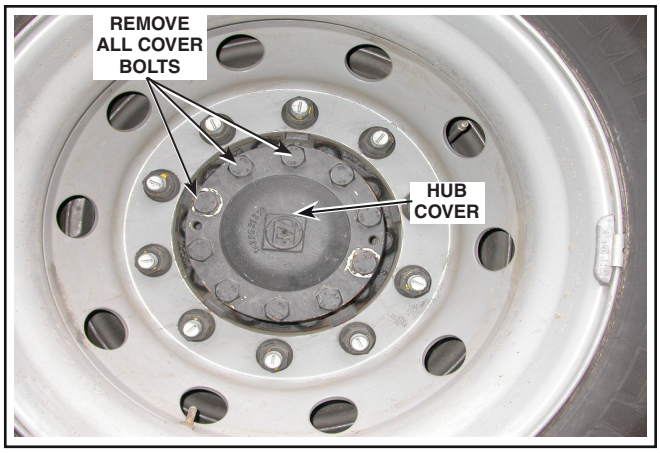


Figure 3 - Remove Hub Cover

☞ **NOTE:**

See the manual from the rear axle manufacturer for the procedure. Be sure to respect the following warnings, as well as those from the manufacturer.

☞ **WARNING:**

Under no circumstances should HEV and non-ZF transmission-equipped vehicles be towed without first having both the driven axle shafts disconnected. This precaution is essential in order to avoid damaging the transmission and other major drive train components.

The ONLY exception to this rule would be in the case of towing out of a dangerous location where safety would be put at risk.

For HEV buses, ensure to set the drive selector to neutral.

Buses equipped with ZF transmission may be towed WITHOUT their drive shafts being removed.

After identifying that the bus is equipped with a ZF transmission (printed on the right-hand side of the drive selector), buses with ZF transmissions ONLY may be handled under the following conditions:

- **Speed range selector in N (Neutral) position**
- **Maximum towing time: 2 hours**
- **Maximum towing speed: 15 mi/h (25 km/h)**
- **At an ambient temperature of less than -5°F (-15°C) the towing speed is 3 mi/h (5 km/h).**

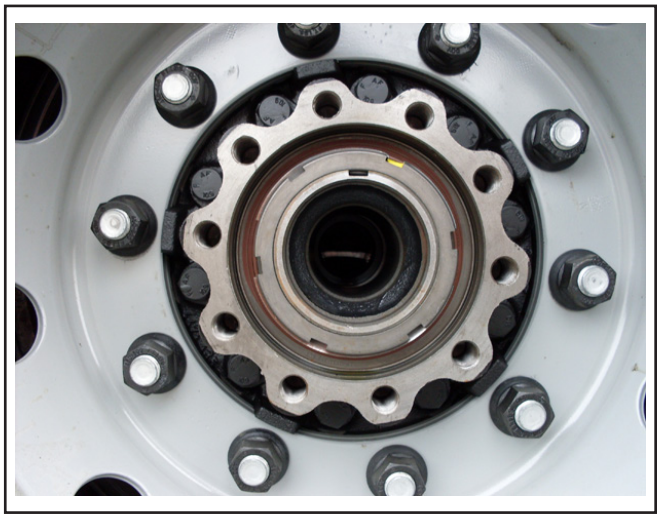


Figure 4 - Hub With Cover Removed

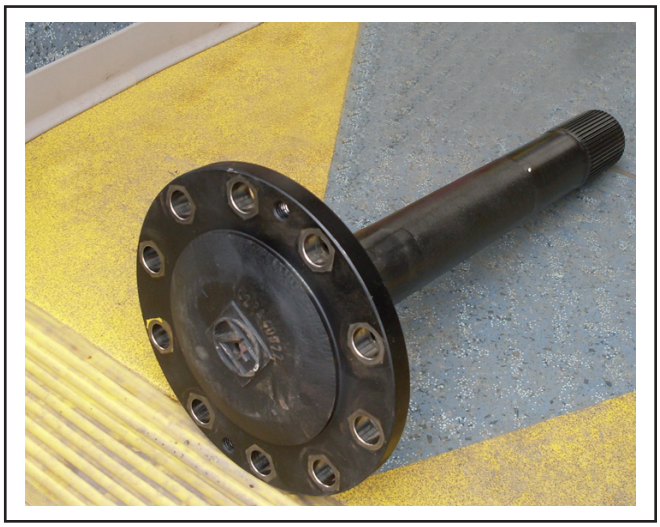


Figure 5 - Drive Shaft Removed

CAUTION:

The driven shaft openings should be covered to prevent lubricant loss and rear axle contamination.

CAUTION:

Lubricate wheel bearings if the towing distance exceeds 30 miles (50 km).

PREPARATION FOR TOWING

1. Remove the dustpan, if so equipped.
2. Ensure that the gear shift selector is placed in **NEUTRAL**.
3. Install the two tow eyes, stored in the front dashboard area, and tow eye connectors in the front of the vehicle. See Figure 6.
4. Place wooden blocks on the ground on both sides of the bus in front of the front wheels. See Figure 7.

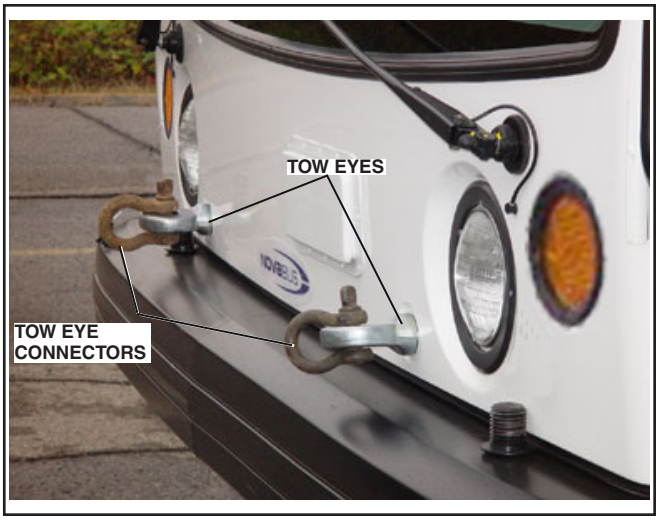


Figure 6 - Tow Eyes and Connectors Installed

Figure 7 - Wooden Blocks Ahead of Front Wheels

5. Using the tow eyes, pull the bus on top of the wood blocks to raise the front of the bus. See Figure 8.

Figure 8 - Bus Pulled up on Wood Blocks

6. Lower the towing beam on the tow truck and install towing forks at each end of the towing beam. See Figure 9. These towing forks are specially manufactured and certified and are available from Prévost Parts, under part number **N20015**.
7. Back up the tow truck close to the front of the vehicle.

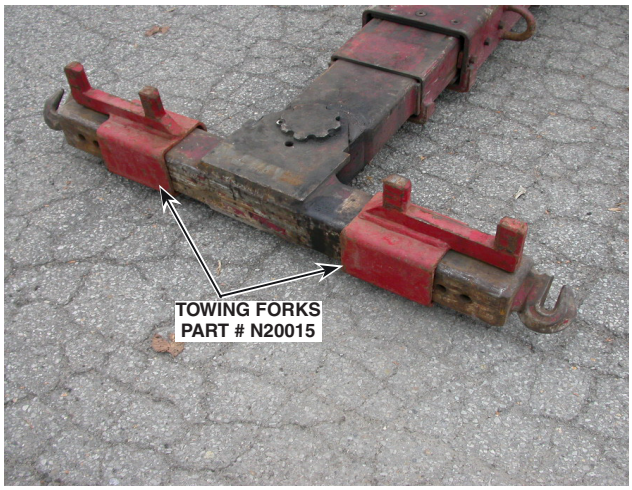


Figure 9 - Towing Beam with Installed Forks

8. Slide the towing beam under the front of the vehicle. Position the towing forks at the designated towing points under the vehicle structure. See Figure 10.

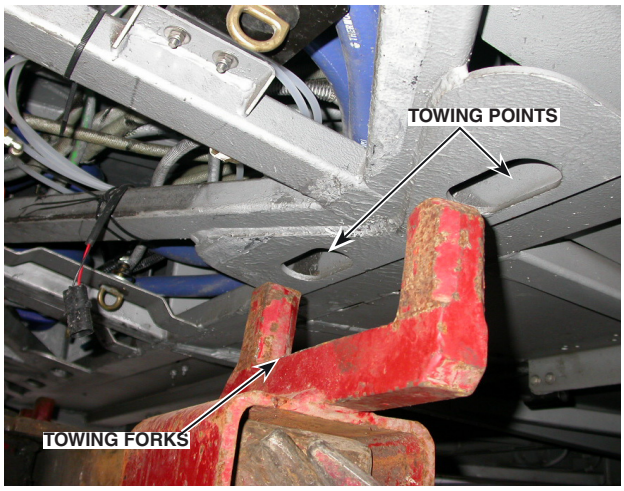


Figure 10 - Towing Forks and Towing Points

9. Raise the towing beam and ensure that the towing forks fit inside the towing points in the chassis at the front of the vehicle.
10. Raise the vehicle for towing. See Figure 11.

CAUTION:

When lifting the vehicle for towing, lift at the minimal height required for the bus to trail the towing vehicle. Ensure that the front wheels are clear of the road surface and do not touch the ground during towing.

Figure 11 - Vehicle Raised for Towing

11. Attach a security chain around the chassis and the tow bar on both the left and right-hand sides of the towing beam. Ensure that the chain is sufficiently tight. See Figure 12.

CAUTION:

When working underneath the vehicle, place safety stands or wood supports under the chassis, to ensure that the vehicle does not slip and cause personal injury.

12. Once the chain is tight, remove any safety supports and pull the vehicle toward the tow truck into its towing position.
13. Verify the location of the compressed air connector, in order to supply air to the bus while being towed. There are various locations for these tow connectors. Depending on the model of bus, the locations are as follows, and illustrated in Figure 13:

    a. At the front of the vehicle near the towing points.

    b. At the front of the vehicle underneath the dashboard.

    c. On the streetside of the vehicle, accessible via the windshield washer door.

    d. At the rear of the vehicle, just ahead of the motor, accessible through the rear streetside access panel.

    Connect an air hose between the connector and the tow truck's compressed-air supply. See Figure 13.

14. Open the valve at the tow connector on the bus. See Figure 13.

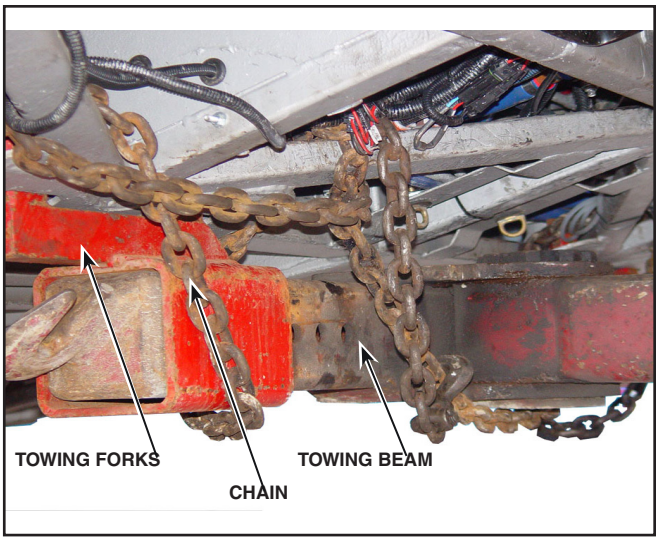


Figure 12 - Chain Around Towing Beam

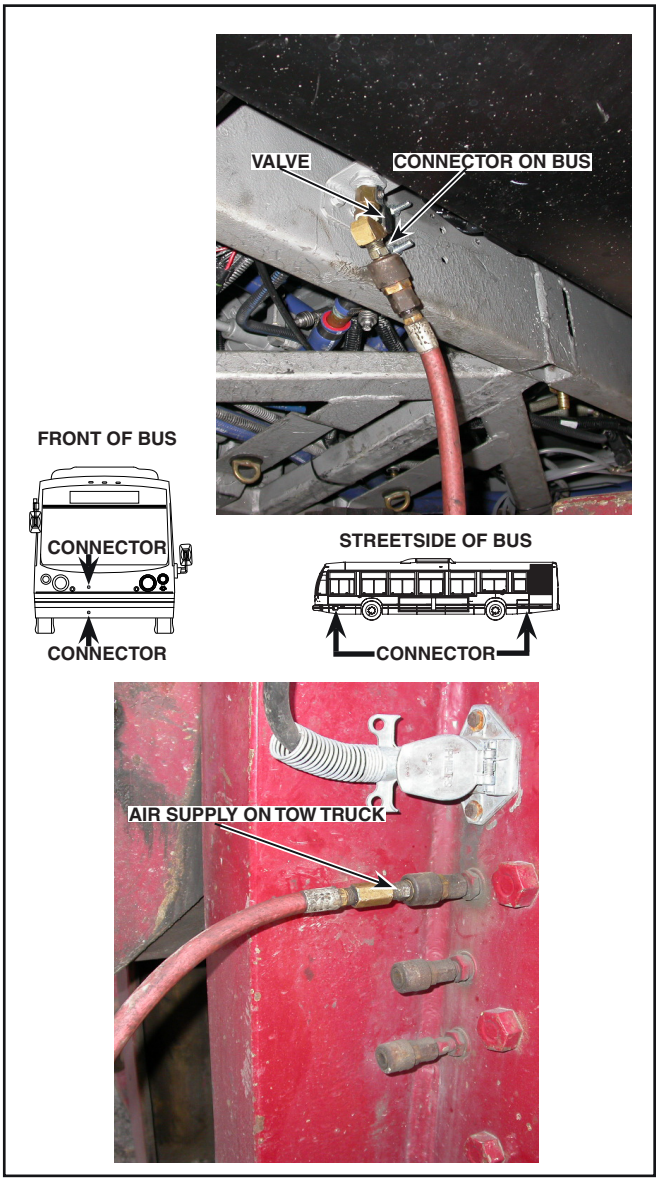


Figure 13 - Air Hose Connected on Bus and Tow Truck

TOWING LIGHTS

1. Affix safety towing lights to the rear of the bus as required by regulation. See Figure 14.
2. Attach a wiring cable to the towing lights and pass it through the interior of the bus. Pass the cable through the rear engine door, the interior engine access panels and exit via the operator's window. For those buses so equipped, an optional front towing electrical plug (near either headlight) may be used, in order to operate the vehicle's lights during towing. See Figure 15.

Figure 14 - Safety Towing Lights Attached to Rear of Vehicle

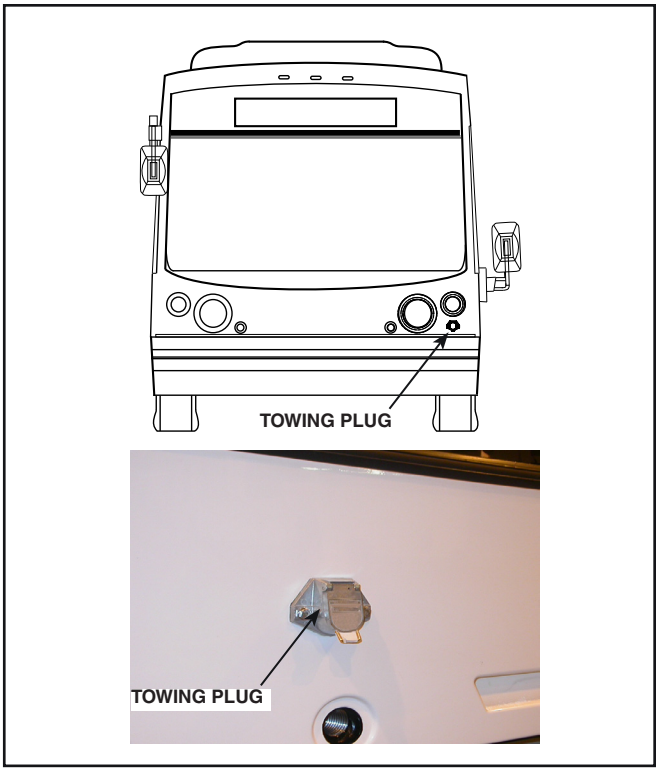


Figure 15 - Locations of Towing Plug (Optional)

HOISTING THE VEHICLE FOR MAINTENANCE

Use only the hoisting points indicated in Figure 2.

☞ **WARNING:**

Follow your internal safety procedures; use appropriate safety equipment for your protection.

☞ **IMPORTANT:**

Before lifting the vehicle with the hoist (jack) positioned underneath the front axle, make sure to bleed off air from both suspension bellows.

HOISTING THE VEHICLE IN AN EMERGENCY

This procedure applies to all vehicles being hoisted outside a garage environment. It is vitally important to follow each step of this procedure, as well as all warnings, etc. Doing so will ensure compliance with industry standards and create a secure and efficient process. Omitting any step, or neglecting to follow security requirements, may result in serious bodily injury, as well as damage to the vehicle.

☞ **WARNING:**

- **Raise the vehicle only when it is stationary on a flat, level, solid surface.**
- **Place the transmission in the NEUTRAL position and apply the parking brake BEFORE starting the hoisting procedure.**
- **Ensure that the motor is OFF BEFORE starting the hoisting procedure.**
- **Block the front and the back of the wheels opposite to those that are being raised, in order to prevent movement of the vehicle.**
- **Use only those jacks or supports that comply with the minimum requirements. See the heading TECHNICAL SPECIFICATIONS in this section.**

☞ **IMPORTANT:**

If the jack used to raise the vehicle, either by the front or rear, is positioned at the forward lower radius rod connector clamp (see the heading IDENTIFICATION OF HOISTING POINTS), it is essential to place wood blocks (or equivalent) at one of the places illustrated in Figure 2, depending on the chosen jacking point. Also, see Figure 18.

Only use blocks that have a minimum dimension of 4 in. (10 cm) square and 10 in. (25 cm) long.

FRONT AXLE

See Figure 17 to identify the main components of the front axle.

☞ **WARNING:**

Never work under a vehicle supported by one or more jacks, even if supports are in place.

IDENTIFICATION OF HOISTING POINTS

The designated vehicle hoisting points for the proper placement of jacks are situated at each forward lower radius rod connector clamp (V-Drive) or transverse tube (T-Drive). See Figure 17.

☞ **WARNING:**

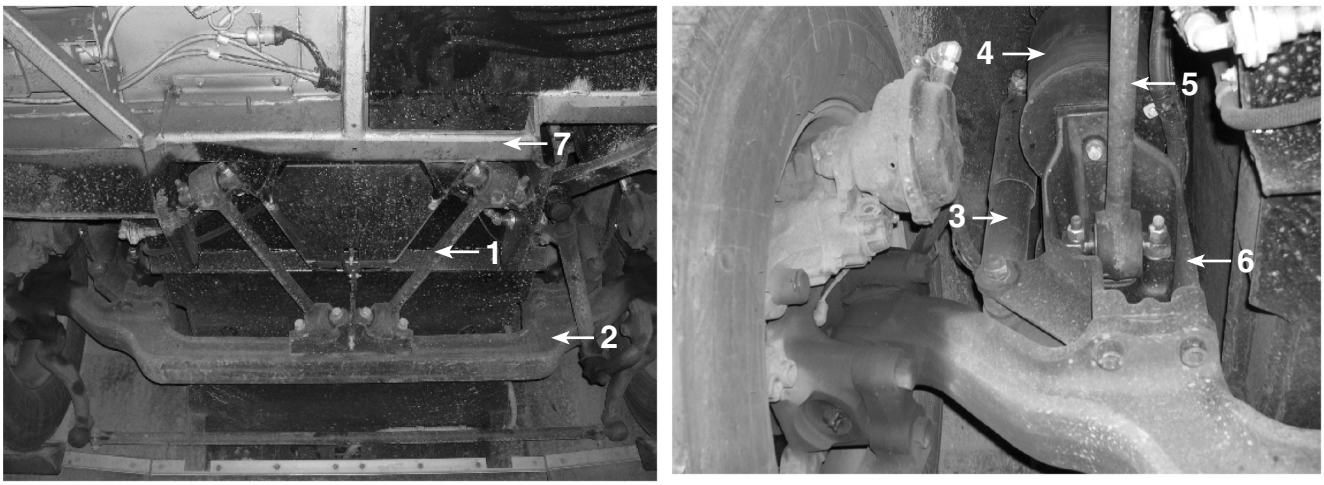
If the vehicle is too low to use this hoisting point, raise the vehicle from the front (see Figures 19 and 20 for the appropriate hoisting points) and place a support under one of the support points. See the heading IDENTIFICATION OF FRONT AXLE SUPPORT POINTS in this section. Then, use one or more jacks under the forward lower radius rod connector clamps (V-Drive) or transverse tube (T-Drive).

IDENTIFICATION OF FRONT AXLE SUPPORT POINTS

The designated support points for the proper placement of supports are located under each support pad. See Figures 2 and 21.

If it is impossible to place a support under a support pad, due to the presence of a jack, it can be placed under the front axle, as indicated in Figure 18.

Figure 16 - Positioning of Wood Blocks



1. LOWER RADIUS ROD
2. FRONT AXLE
3. SHOCK ABSORBER
4. AIR SPRING
5. UPPER RADIUS ROD
6. SUSPENSION MOUNT
7. TUBE

Figure 17 - Main Front Axle Components

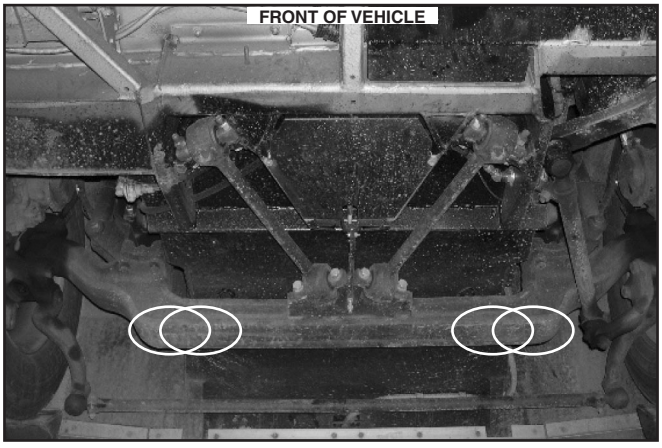


Figure 18 - Front Axle Support Points

Figure 19 - Hoisting Points (Left Front)

Figure 20 - Hoisting Points (Right Front)

Figure 21 - Positioning of Front Supports (Left Side)

REAR AXLE

See Figure 22 to identify the main components of the rear axle.

WARNING:

Never work under a vehicle supported by one or more jacks, even if supports are in place.

IDENTIFICATION OF HOISTING POINTS FOR THE REAR AXLE

The designated vehicle hoisting points for the proper placement of jacks are situated at each forward lower radius rod connector clamp. See Figures 22 and 25.

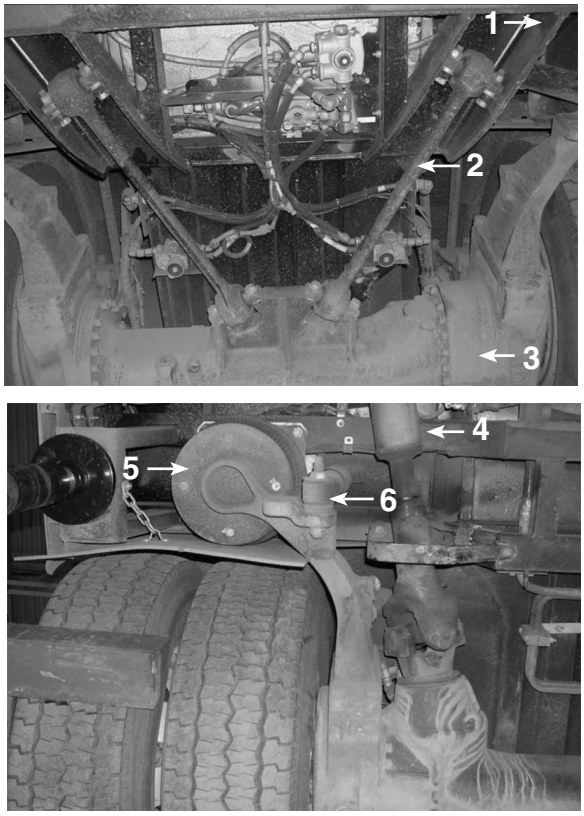
WARNING:

If the vehicle is too low to use this hoisting point, raise the vehicle from the rear (see Figures 23 and 24 for the appropriate hoisting points) and place a support under one or several support points. See the heading IDENTIFICATION OF REAR AXLE SUPPORT POINTS in this section. Then, use one or more jacks under the forward lower radius rod connector clamps.

IDENTIFICATION OF REAR AXLE SUPPORT POINTS

The designated vehicle hoisting points for the proper placement of supports are located under each support pad. The support pads are located along the underside of the vehicle, behind the rear wheels. See Figure 1.

If it is impossible to place a support under a support pad, due to the presence of a jack, it can be placed under the rear axle, as indicated in Figure 1.



1. SUSPENSION SUPPORT
2. LOWER RADIUS ROD
3. REAR AXLE
4. DRIVE SHAFT
5. BELLOWS
6. SHOCK ABSORBER

Figure 22 - Main Rear Axle Components

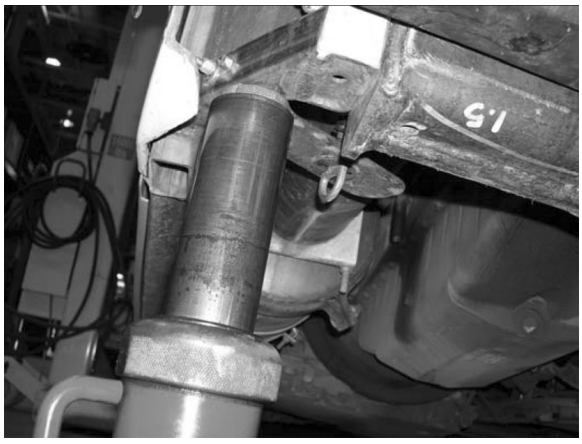


Figure 23 - Hoisting Points (Left Rear)

Figure 24 - Hoisting Points (Right Rear)

Figure 25 - Positioning of Rear Supports (Right Side)

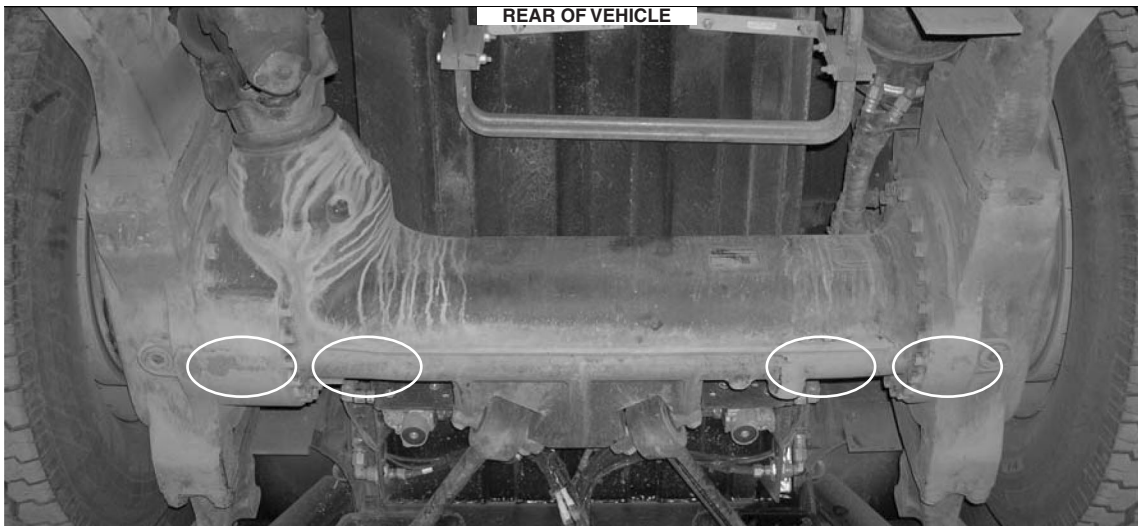


Figure 26 - Rear Axle Support Points

TOW PLUG PROGRAMMING AND VERIFICATION PROCEDURE

This procedure is designed to verify the proper operation of a vehicle's optional tow plug installed on the front shell of the vehicle. See Figure 15. To perform this procedure the following material is required.

- Laptop computer
- V-BEA communication cable
- Jumper

1. Connect the jumper to power module 39, as shown in Figure 27.

CAUTION:

This module must be connected to a 12-volt circuit. See Figure 27.

2. Set the **DRIVER'S MASTER CONTROL SWITCH** to **ON**.
3. Establish a connection with the Master ID MCM.
4. Click the V-BEA icon and select the FB_Tow_Plug_MCM.
5. Upload the V-BEA programming for the tow plug.
6. Once the programming is uploaded into the MCM, click on **BODY ECU** to verify that modules 36 and 39 are set to 1. See Figure 28.
7. Disconnect the B-Bus network connector from module 39 (yellow and green wire).
8. Disconnect the jumper and upload the V-BEA program for the vehicle.

NOTE:

Once the V-BEA programming is uploaded into the vehicle, it is no longer possible to access module 39 (tow plug) programming.

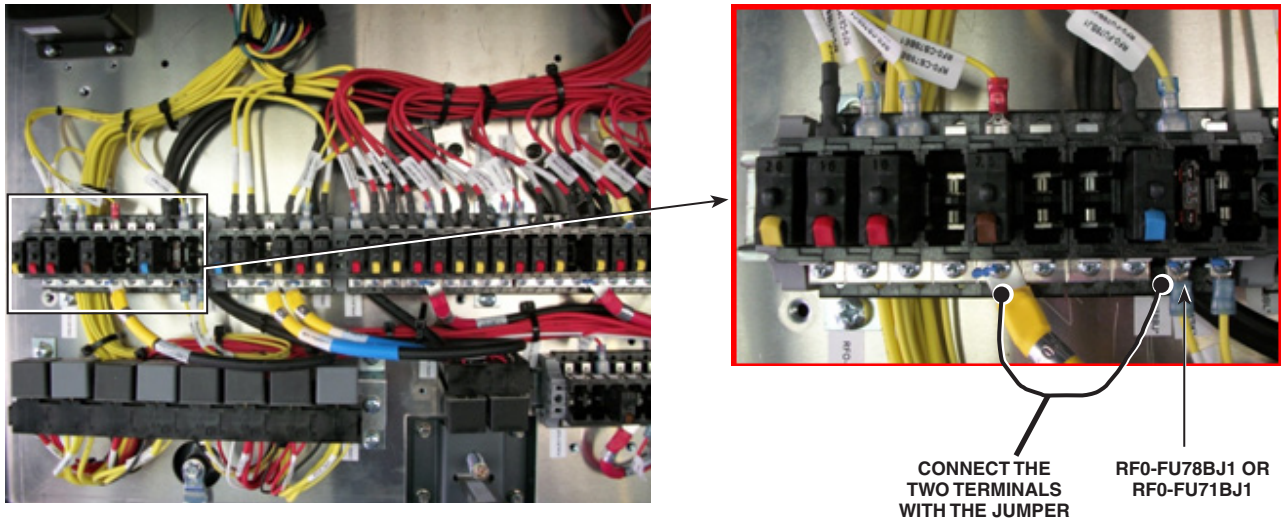


Figure 27 - Jumper Connections

ECU address	ECU name	Location	HW part number	HW serial number	PBL part number	SSW part number	ECU type	State
39	39	RF0	20585155	5130053	70350376	70361323	IOA005	1
36	36	Lateral Consol	70361720	8130031	22380000	70378617	CECM	1

Figure 28 - Modules' Setting

TECHNICAL SPECIFICATIONS

MINIMUM JACK REQUIREMENTS

Weight Capacity ..... 10 tons (10,000 kg)

Diameter of jack head..... 2 in. (51 mm)

MINIMUM SUPPORT REQUIREMENTS

Weight Capacity ..... 10 tons (10,000 kg)

Diameter of support head ..... 6 in. (152 mm)

TRACK

Aluminum Wheels

Front ..... 86.8 in. (2,205 mm)

Rear..... 77.2 in. (1,960 mm)

Steel Wheels

Front ..... 86.3 in. (2,191 mm)

Rear..... 76.5 in. (1,942 mm)

CENTER OF GRAVITY

Length

To front of rear axle..... 78.9 in. (2,003 mm)

To rear of front axle..... 165.2 in. (4197 mm)

Width

To the left of bus centerline ..... 3.1 in. (79 mm)

Height

From the ground ..... 46.9 in. (1,191 mm)

WHEELBASE

..... 244 in. (6,200 mm)

SECTION 18-500.00A
HOISTING AND TOWING - ARTICULATED VEHICLE

TOWING THE ARTICULATED VEHICLE

TURNTABLE

The articulated vehicle has a rotating turntable joining the front and rear sections. This turntable must still be allowed to rotate to some extent during towing, since the vehicle needs to navigate turns, etc. Therefore, there is no need to lock the turntable during towing.

Towing the articulated vehicle is identical to towing a conventional 40' Nova LFS. See the main section of this document for proper information.

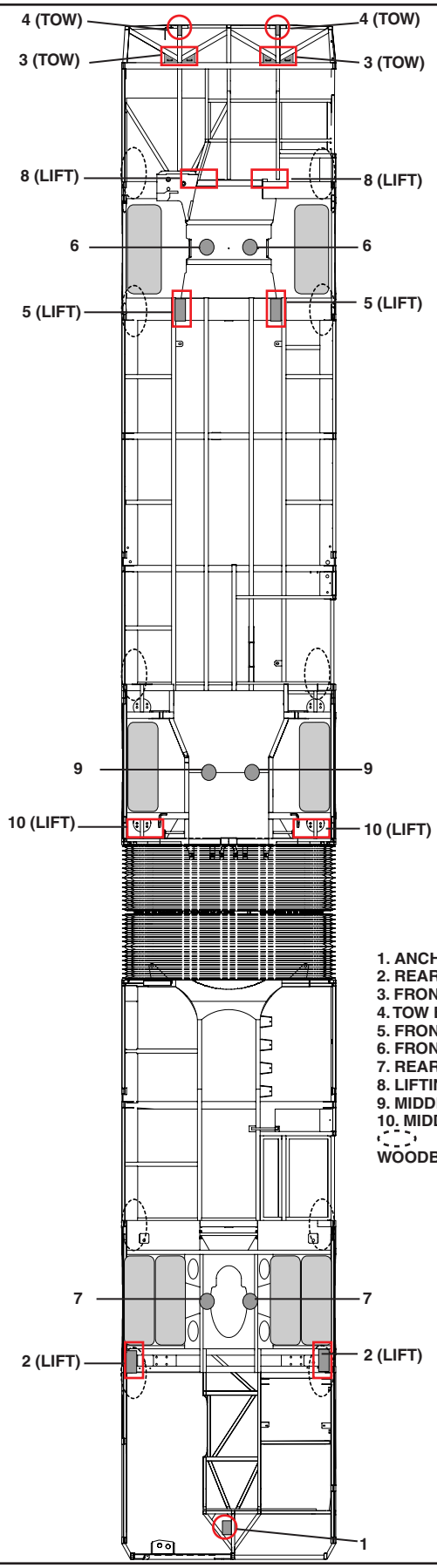
However, the articulated vehicle does have additional hoisting points, as a result of its front and rear sections. See Figures A2 and A3 for the location of the towing and hoisting points of the articulated vehicle.

Also see Figures A1 for the support points for the middle axle.

CAUTION:

Additional care must be taken when towing an articulated vehicle in wet, slippery conditions with the engine switched off. The articulation unit must overcome a certain amount of force to enable the damper units to adjust the angle of the rear end relative to the direction of the front end. Make sure that when making tight turns, there is proper articulation movement, and the rear end does not remain in a straight line with the front end.

Figure A1 - Support Points for the Middle Axle



V-DRIVE CONFIGURATION
1. ANCHORING PLATE FOR TOWING (DO NOT LIFT)
2. REAR HOISTING PADS
3. FRONT TOWING PLATES
4. TOW EYES (NOT TO BE USED FOR LIFTING)
5. FRONT HOISTING PADS
6. FRONT AXLE (HOISTING)
7. REAR AXLE (HOISTING)
8. LIFTING POINT (HOISTING)
9. MIDDLE AXLE (HOISTING)
10. MIDDLE HOISTING PADS
( ) = SUITABLE LOCATIONS FOR WOODBLOCK SUPPORTS

Figure A2 - Hoisting and Towing Points (Articulated Vehicle)

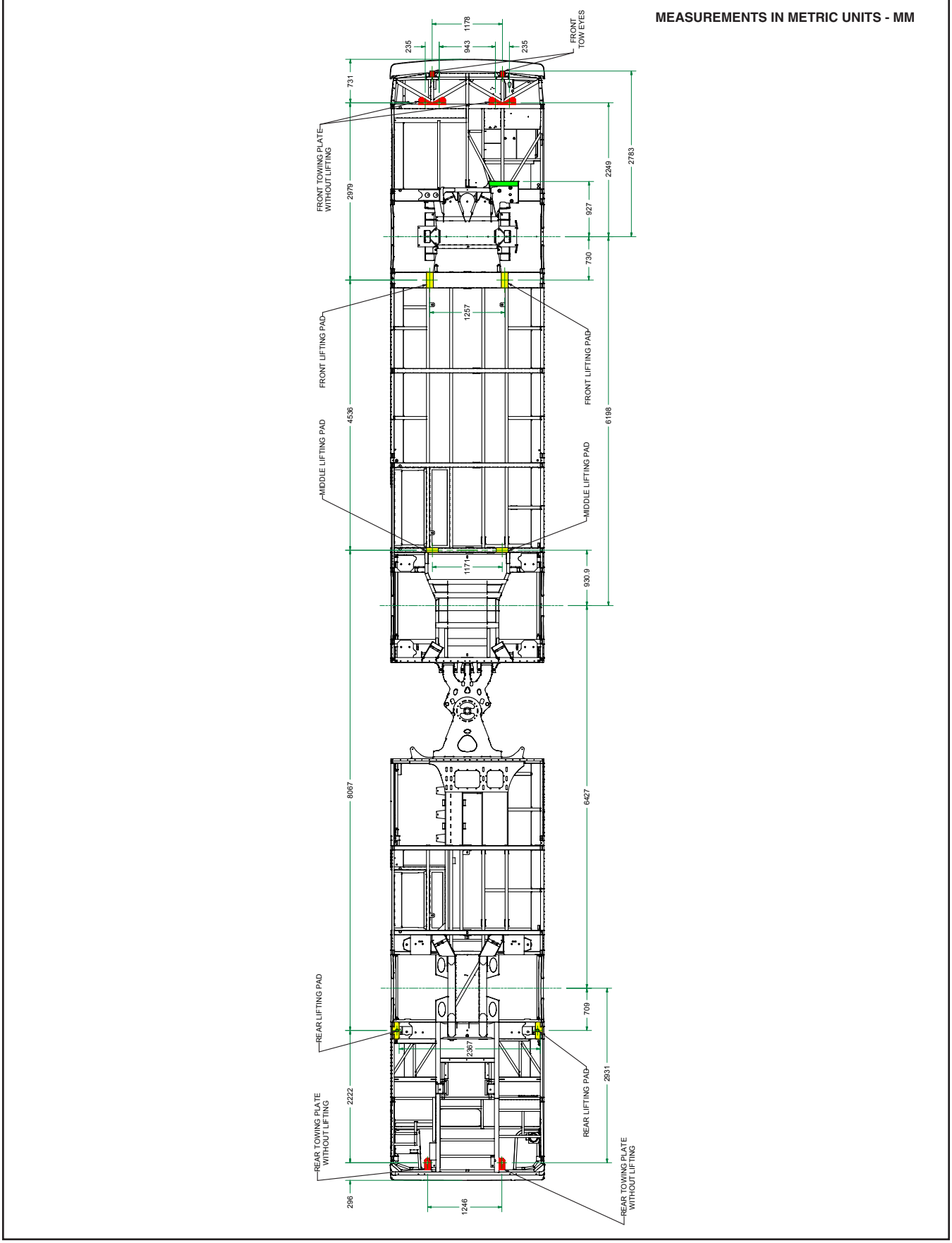


Figure A3 - Hoisting and Towing Points (T-Drive Articulated Vehicle)

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APPENDIX 6 - SAMPLE TOWING DATA FILE

date, period, batch, invoice, unit, kms, hook-up, fbhrs, fhrs, waiting, recovery, total, tax, sub-total
16/01/05,31/01/05,B62,622135,6676,028,075.00,0000,0000,0000,0000,195.38,12.78,182.60,

NOTES:

The above is a sample of the file. Note that the file that is sent to TTC will not have the headings shown above. (shown as demonstration only) The date format is in DD/MM/YY. The time format is MMMM (total number of minutes)

TORONTO TRANSIT COMMISSION
REQUEST FOR PROPOSAL NO. P08BI13049

APPENDIX 7 - VEHICLE INFORMATION

No.	Year	Make	Model	Ministry of Transportation Vehicle Licence Number	Licence Place No.	Vehicle Indentification No. (VIN)

TOWING SERVICES FOR TTC BUSES & NON-REV VEHICLES FOR UP TO A 3 YEAR TERM – P08BI13049

PROPOSAL SUBMISSION CHECKLIST

PRIOR TO SUBMITTING YOUR PROPOSAL ENSURE YOU HAVE INCLUDED ALL MANDATORY AND OTHER SUBMISSION REQUIREMENTS AS DETAILED IN THE INSTRUCTIONS TO TENDERERS AS FOLLOWS:

- ☐ **A signed copy of the Form of Proposal including the Proponent's name and address. Ensure all pages of the Form of Proposal are submitted.**
- ☐ **A hard copy of the Price Schedule including The proposed hourly rated or fixed fee**
- ☐ **Completed Document 00422 – SUBMISSION REQUIREMENTS FORM**
- ☐ **Completed Document 00630 – IRREVOCABLE LETTER OF CREDIT**
- ☐ **List of Vehicles that will be used in the Performance of the work**
- ☐ **Copies of the Proponent's City of Toronto's truck and operators' licence(s)**
- ☐ **A soft copy of the Price schedule on a USB flash drive or Compact Disk**

NOTE:

FAILURE TO PROVIDE ALL REQUESTED INFORMATION OR INCORRECTLY COMPLETING THE PROPOSAL FORM MAY RENDER A PROPONENT NON-COMPLIANT AND UNACCEPTABLE.